NPWS
An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

The Status of EU Protected Habitats and Species in Ireland

HABITAT ASSESSMENTS

Volume 2

2025



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NATIONAL LEVEL	
1 General information	
1.1 Member State	***IE***
1.2 Habitat code	*Select code from habitat checklist in the Reference portal* *(do not use subtypes)*
1.3i Habitat description	*Give an overview description of the habitat (ecology, etc) suitable for use in the summary overview Article 17 publication.* *Select a photograph suitable for publication.*

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	*Year or period when distribution was last determined*
2.2 Distribution map	*Submit a map together with relevant metadata following the technical specifications in the Explanatory Notes. The standard for habitat distribution is 10x10km ETRS 89 grid cells, LAEA (EPSG:3035) projection.*
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	*MS can submit an additional map, deviating from standard submission map under 2.2 and/or a range map*
2.5 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 2.1–2.4*

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic, Marine Atlantic*
3.2 First time reporting	*Please indicate if this is the first reporting round for this habitat in this biogeographical/marine region* *YES/NO*
3.3 Additional information	*Please indicate the nature of the first-time reporting. Any other additional information is optional.*

3.4 Sources of information	*For data reported in the sections below provide relevant available bibliographic references and/or link to Internet site(s)*

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	*Total surface area of the range within biogeographical/marine region concerned in km²*	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	*2013 - 2024 (rolling 12-year time window) or period as close as possible to that. The short-term trend should be used for the assessment of range*	
4.4 Short-term trend Direction	*stable / increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	*Percentage change over the period indicated in the field 4.3. If a precise value is known, please provide the same value under both minimum and maximum*
	b) Estimated Maximum	*Percentage change over the period indicated in the field 4.3. If a precise value is known, please provide the same value under both minimum and maximum*
	c) Pre-defined range	*Where a precise value is not known (4.5 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ *0 – 12%* ☐ *13 - 25%* ☐ *26 – 50%* ☐ *51 – 100%* ☐ *>100%*

	d) Unknown	*Indicate if the trend magnitude is unknown*
4.6 Short-term trend Magnitude Type of estimate *Optional*	*Best estimate / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	*2000 - 2024 (rolling 24-year time window) or period as close as possible to that.*	
4.9 Long-term trend Direction *Optional*	*stable / increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	*Percentage change over the period indicated in the field 4.8. If a precise value is known provide the same value under both minimum and maximum*
	b) Maximum	*Percentage change over the period indicated in the field 4.8. If a precise value is known provide the same value under both minimum and maximum*
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km² or*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*

	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	*Indicate the surface area (km2) at the date of entry of the Directive into force (free text).*	
4.14 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 4.1–4.13* *Free text*	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	*Year or period when surface area was last determined*	
5.2 Surface area *(in km²)*	**a) Minimum**	*Provide either interval (a and b) and/or best single value (c)*
	b) Maximum	*Provide either interval (a and b) and/or best single value (c)*
	c) Best single value	*Provide either interval (a and b) and/or best single value (c)*
5.3 Type of estimate	*Best estimate / 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	

	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	*2013 - 2024 (rolling 12-year time window) or period as close as possible to it. The short-term trend should be used for the assessment of area covered by habitat type*	
5.7 Short-term trend Direction	*stable / increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	*Percentage change over the period indicated in the field 5.6. If a precise value is known, please provide the same value under both minimum and maximum*
	b) Estimated Maximum	*Percentage change over the period indicated in the field 5.6. If a precise value is known, please provide the same value under both minimum and maximum*
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ *0 – 12%* ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	*Indicate if the trend magnitude is unknown*
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	*2000 - 2024 (rolling 24-year time window) or period as close as possible to it.*	
5.12 Long-term trend Direction *Optional*	*stable / increasing / decreasing / uncertain / unknown*	

<table>
<tr><td rowspan="3">5.13 Long-term trend Magnitude

Optional</td><td>a) Minimum</td><td colspan="2">Percentage change over the period indicated in the field 5.11. If a precise value is known provide the same value under both minimum and maximum</td></tr>
<tr><td>b) Maximum</td><td colspan="2">Percentage change over the period indicated in field 5.11. If a precise value is known provide the same value under both minimum and maximum</td></tr>
<tr><td>c) Confidence interval</td><td colspan="2">Indicate confidence interval if a statistically reliable method is used</td></tr>
<tr><td>5.14 Long-term trend Method used

Optional</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="3">a) In km² or</td></tr>
<tr><td colspan="3">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="3">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="3">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td colspan="2">☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="3">☐ Expert opinion</td></tr>
<tr><td colspan="3">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="3">Indicate the surface area (km2) at the date of entry of the Directive into force (free text).</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="3">Other relevant information, complementary to the data requested under fields 5.1–5.16
Free text</td></tr>
</table>

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	*In km²*
		Maximum	*In km²*
	b) Area in not-good condition	**Minimum**	*In km²*
		Maximum	*In km²*
	c) Area where condition is not known	**Minimum**	*In km²*
		Maximum	*In km²*
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	*2013 - 2024 (rolling 12-year time window) or period as close as possible to it. The short-term trend is to be used for the assessment of structure and functions*		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		
6.7 Typical species Method used *Optional*	*If the list or the methodology has changed, describe method(s) used to assess the status of typical species as part of the overall assessment of structure and functions*		
6.8 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 6.1–6.7* *Free text*		

7 Main pressures and threats	
7.1 Characterisation of pressures/threats	
a) Pressure	*List a maximum of 20 pressures using the code-list provided in the Reference portal and fill b) to f) for pressures.*
b) Timing	☐ *in the past but now suspended due to measures* ☐ *ongoing* ☐ *ongoing and likely to be in the future* ☐ *only in future*
c) Scope (proportion of area affected)	*Fill in for 'ongoing' and 'ongoing and likely to be in the future':* ☐ *whole >90%* ☐ *majority 50 – 90%* ☐ *minority <50%*
d) Influence (on area or habitat condition)	*Fill in for 'ongoing' and 'ongoing and likely to be in the future'.* ☐ *High influence* ☐ *Medium influence* ☐ *Low influence*
e) Invasive alien species of Union concern	*Fill where pressure on 'IAS of Union concern' is selected. Please select from relevant species-list (see Article 17 reference portal)*
f) Other invasive alien species *Optional*	*Fill where pressure 'other invasive alien species - other than species of Union concern' is selected. Please select from EASIN database (see Article 17 reference portal)*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	*If available, provide sources of information (URL, metadata) supporting evidence of pressures*
7.4 Additional information *Optional*	*Other relevant information, complementary to the data requested under field 7.1* *Free text*

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (YES/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* *c) Part of measures identified have been taken* *d) Most/all of measures identified have been taken* *If no, a justification must be provided in free text field 8.7*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*

8.6 List of main conservation measures	*List a maximum of 20 measures using code list provided in the Reference portal*
8.7 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 8.1–8.6* *Free text*

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	*Good / Poor / Bad / Unknown*
	b) Area	*Good / Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor / Bad / Unknown*
9.2 Additional information *Optional*	*Other relevant information, complementary to the data requested under field 9.1* *Free text*	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	a) No, there is no difference
	b) yes, due to genuine change	b) yes, due to genuine change
	c) yes, due to improved knowledge/more accurate data	c) yes, due to improved knowledge/more accurate data
	d) yes, due to the use of different method	d) yes, due to the use of different method

	e) yes, but nature of change is unknown	e) yes, but nature of change is unknown
	f) yes, due to other reasons	f) yes, due to other reasons
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 10.1–10.7* *Free text*	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	*Provide either interval (a and b) and/or best single value(c)*
	b) Maximum	*Provide either interval (a and b) and/or best single value (c)*
	c) Best single value	*Provide either interval (a and b) and/or best single value (c)*
11.2 Type of estimate	*Best estimate / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	*Other relevant information, complementary to the data requested under fields 11.1–11.7* *Free text*

12 Complementary information	
12.1 Justification of % thresholds for trends *Optional*	*In case a MS is not using the indicative suggested value of 1% per year when assessing trends, this should be duly justified in this free text field*
12.2 Other relevant information *Optional*	*Other relevant information not specific for the sections of this format.* *Free text*

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1110 Sandbanks which are slightly covered by sea water all the time**
1.2i Habitat short name	**Sandbanks**
1.3 Habitat description	The EU interpretation manual describes 'Sandbanks which are slightly covered by seawater all the time' as permanently submerged sandbanks where the water depth is seldom more than 20 m Below Chart Datum (BCD). In the North Atlantic these include non-vegetated sandbanks or sandbanks with vegetation belonging to *Zostera* sp. and free-living species of the Corallinaceae family. In Irish waters this habitat, where it occurs, is comprised of distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) that may arise from horizontal or sloping plains of sediment that range from gravel to fine sand. They are primarily composed of sandy sediments permanently covered by water, at depths of less than 20 m BCD (though the banks may extend to water depths greater than 20 m, e.g. Hempton's Turbot Bank). The diversity and types of community associated with this habitat are determined particularly by sediment type together with a variety of other physical, chemical and hydrographical factors. These include geographical location (influencing water temperature), the relative exposure of the coast, topographical structure of the habitat and differences in the depth, turbidity and salinity of the surrounding water. Acoustic sea bed mapping has aided greatly in understanding these habitat types in recent times. Seismic profiling has interpreted the origin of near-shore sandbanks in the Irish Sea as moraines formed during de-glaciation and this may be typical across the range. Near-shore hydrodynamics have been identified as a major control on sandbank morphology and coastal configuration. Soft glacial coastal sediments have little resistance to wave and hydrodynamic action and on the eastern seaboard of Ireland are slowly eroding over a geological period. Side-scan sonar and multibeam sonar have shown that sandbank habitat is typically composed of superficial mobile sediment that forms into sand-waves or "stippled bank crest facies" (wavelets shaped into the sand) as noted at Kish Bank. This morphological expression is also apparent at the Hempton's Turbot Bank off Donegal and a range of coastal features recently mapped in the Irish Sea. The movement of sediment over sandbanks appears to be typical of a dynamic substrate, supplied and stripped of sediment in apparent equilibrium. Sand-waves increase in amplitude approaching the edge of the banks and this is thought to be indicative of a current being concentrated in shallower water. The morphology and resistance of banks to bottom current is such that it tends to produce a more dynamic environment than that in the adjacent areas. There are currently 19 identified sandbank features in Ireland. A wide range of sandbanks have been surveyed biologically in Ireland, including Ballybunion/Turbot Bank at the mouth of the River Shannon

	and Long Bank/Holden's Bed, Blackwater Bank and Kish Bank, Lucifer Bank/Bray Bank, and Hempton's Turbot Bank. Sandbank habitats in Irish waters are predominantly composed of a fine sand community typified by the presence of the polychaete worm *Nephtys cirrosa*. These habitats commonly record a range of species including *Bathyporeia elegans, Polygordus lacteus, Saccocirrus papillocercus*, *Pisione remota, Nephtys cirrosa, Magelona mirabilis, Eumida bahusiensis, Nephtys longosetosa, Spiophanes bombyx, Donax vittatus, Glycera lapidum, Urothoe brevicornis, Pontocrates altamarinus, Fabulina fabula* and *Pisidia longicornis*. The species found tend to be those adapted to mobile substrates but all of the noted species recorded in Irish waters are also frequently found in similar shallow coastal sediment habitats. Sandbanks with a significant proportion of coarse sediment are also present, e.g. Hempton's Turbot Bank.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2018***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The 19 Sandbanks were originally identified through Admiralty Charts and this has been supplemented by more recent seabed mapping.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/**NO***
3.3 Additional information	This habitat was first reported during the reporting cycle 2000-2006. Mapping of Sandbank habitat was completed primarily using GIS methods. The main source of information on the bathymetry was the UK Home Office Admiralty Charts.

	Additional sources of information: Borja, Á., Franco, J. & Pérez, V. (2000) A marine biotic index to establish the ecological quality of soft-bottom benthos within European estuarine and coastal environments. *Marine Pollution Bulletin,* 40, 1100-1114. Borja, Á., Muxika, I. & Franco, J. (2003) The application of a Marine Biotic Index to different impact sources affecting soft-bottom benthic communities along European coasts. *Marine Pollution Bulletin,* 46, 835-845. Lincoln, R.J. (1979) *British Marine Amphipoda: Gammaridea*. British Museum (Natural History). London 1979. MERC (2013) Subtidal Benthic Survey of Hempton's Turbot Bank. Unpublished report to the Marine Institute.
3.4 Sources of information	Aqua-Fact International Services Ltd. (1989) *Benthic studies off the Wexford coast. Faunal and sedimentological studies at Long Bank and Ballyteigue Bay*. 48pp. Aqua-Fact International Services Ltd. (2007) Marine Surveys of two Irish Sandbank cSACs. A report to National Parks and Wildlife Service. 32pp. Aqua-Fact International Services Ltd. (2008) Analysis of samples from the Hempton's Turbot Bank. A report to National Parks and Wildlife Service. 8pp. Aqua-Fact International Services Ltd. (2012) Subtidal Benthic Investigations of the Greater Codling Bank. A report to National Parks and Wildlife Service. 139pp. Aquatic Services Unit (2010) A benthic survey of sandbank features in the Irish Sea: A biological survey of the Bray, Money-weights and Lucifer Banks. A report to National Parks and Wildlife Service. 42pp. CMRC (2006-12) Marine Irish Digital Atlas. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/. DCENR (2013) Spatial data for seismic surveys and hydrocarbon wells, Department of Communications, Energy and Natural Resources, http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome. Environmental Impact Statement: Kish/Bray Wind Park. Saorgus Energy Ltd, Tralee, Co. Kerry. Roche, C., Lyons, D.O., Fariñas Franco, J. & O'Connor, B. (2007) Benthic surveys of sandbanks in the Irish Sea. National Parks and Wildlife Service. *Irish Wildlife Manuals,* No. 29. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. Scally, L., Pfeiffer, N.J., and Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland. Seazone (2011) UKHO Admiralty Raster Charts for Irish Waters.

	Service, M., Brown, C. & McDougall, A. (2004) MESH Habitat Mapping: Hempton's Turbot Bank. Cruise Report LF004 13-06-04 to 17-06-04. Wheeler, A.J., Walshe, J. & Sutton, G.D. (2000) Geological appraisal of the Kish, Burford, Bray and Fraser Banks, Outer Dublin Bay Area. Marine Resource Series No. 13: pp. 35. White, J. (2006) Survey Data Analysis for Hempton's Turbot Bank: An investigation into the categorisation of survey data sets for mapping a sand wave seafloor system. Undertaken as part of the INTERREG IIIB project Mapping European Seabed Habitats. Published by the Marine Institute.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***2,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2007-2018***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

4.8 Long-term trend Period *Optional*	***1994-2018***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 2,800 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was estimated based on partial data with some extrapolation and/or modelling. The current range is considered to be the baseline value. The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of Sandbanks.	

	There is no evidence of any change to the range of this habitat feature in Ireland since the last reporting period.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2007-2018***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***247 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
5.6 Short-term trend Period	***2007-2018***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="3">1994-2018</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="3"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td colspan="2"></td></tr>
<tr><td>b) Maximum</td><td colspan="2"></td></tr>
<tr><td>c) Confidence interval</td><td colspan="2"></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="3">a) 247 km²</td></tr>
<tr><td colspan="3">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="3">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="3">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td colspan="2">☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="3">☐ Expert opinion</td></tr>
<tr><td colspan="3">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The Favourable Reference Area (FRA) has been set as the current area as it is considered sufficient for the long-term viability of the habitat. Mapping of Sandbank habitat was completed primarily using GIS methods. The main source of information on the bathymetry was the UK Home Office Admiralty Charts. These were used because they provide a consistent 20 m contour on which to estimate the margins of the Sandbank feature. A significant problem in calculating the national resource of Sandbanks in Ireland is applying a consistent rule to include or exclude the habitat feature. In the western and northern coasts, the Sandbanks are apparently clearly defined and distinct in accordance with the Commission definition. The Irish Sea, which also holds the greatest resource of this feature, poses geographical difficulties. The shallower waters in the coastal zone of the southern Irish Sea show areas of Sandbank and in the northern part the features are noted to be in deeper waters. Because of this natural variability, the best available approach is to look to the prominence or elevation of the habitat relative to its actual location and that of the surrounding waters and use expert judgement to define the lower limit. In deriving this estimate, no areas below the 20 m contour are identified because resolved contours generated by sea bed mapping data are incomplete across the range of the feature. There has been an extensive programme of sea bed mapping in Ireland over the last 20 years. Some areas fringing Sandbank habitat have been mapped and it is possible, with more complete coverage in the future, that a more complete map of Sandbank features may be possible. However, in mobile sediments with a high degree of turbidity, it is likely that the most biologically important area would be already mapped using the current approach. No confirmed impacts with the potential to lead to a change in the area of Sandbanks have been identified since the last reporting period.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***247 km²***
		Maximum	***247 km²***
	b) Area in not-good condition	**Minimum**	***0 km²***
		Maximum	***0 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2007-2024***
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing / uncertain/* ***unknown***
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as for the previous reporting cycle and includes the following species: *Bathyporeia elegans, Pisione remota, Fabulina fabula, Saccorcirrus papillocercus, Magelona mirabilis, Eumida bahusiensis, Spiophanes bombyx, Donax vittatus, Glycera lapidum, Urothoe brevicornis, Pontocrates altamarinus, Haustorius arenarius, Mediomastus fragilis, Nephtys cirrosa, Spisula elliptica* and *Syllis garcia*.
6.8 Additional information *Optional*	The short-term trend direction of Structure and functions is assessed as *unknown* for this reporting cycle (changing from *stable* in 2019), as the pressure 'PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats' has now been identified during this reporting cycle as a pressure acting on the habitat. This pressure may have an effect on the habitat condition of Sandbanks. It is envisaged that there will be a focus on these habitats and improving understanding of their biological communities during the next reporting cycle.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Majority 50-90%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gerritsen, H.D. (2024) Atlas of Commercial Fisheries around Ireland, fourth edition. Marine Institute, Ireland. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data. The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp.
7.4 Additional information *Optional*	Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. A comprehensive analysis of pressures and threats, based on extensive data collection, was conducted during this reporting cycle. In order to assess pressure PG03, a robust methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018-2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion). This analysis revealed that bottom impacting fishing metiers, of low influence, are occurring over the majority of the area of the national habitat resource, and without further surveying, this is having an unknown impact on the structure and functions of the habitat. There is potential for marine renewable energy development on Sandbanks during the next reporting cycle but there is no certainty over the scale or nature of the potential development currently.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* ***b) Measures needed but cannot be identified*** *c) Part of measures identified have been taken* *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	
8.3 Main purpose of the measures taken	
8.4 Location of the measures taken	
8.5 Response to the measures	
8.6 List of main conservation measures	None identified
8.7 Additional information *Optional*	The precise nature of the measure needed to address the fishing pressure observed in this cycle has not yet been identified and will be informed by further investigations planned during the next reporting cycle.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor / Bad /* ***Unknown***
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*.	

	Short-term trend direction of Structure and functions is assessed as *unknown*. The Conservation Status of Structure and functions is *Favourable*. Future prospects of Structure and functions are therefore *Unknown*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** / Inadequate (U1) / *Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving* / deteriorating / **stable** / *unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	There have been no changes in Range or Area since the Directive came into force. Sixty-nine km^2 of the total resource of 247 km^2 of the Sandbanks habitat within four Special Areas of Conservation (SACs) around the coast of Ireland were surveyed to assess the Structure and functions of this habitat during the last reporting period (2013-2018). This area represents 28% of the total national resource for this habitat. This habitat is comprised of a low number of sublittoral soft sediment communities with a limited range of species and sediment types. No changes in any of the indicators used (change to typical species, change	

	to sediment composition, and presence of negative indicator species) were identified at any of the stations sampled. Although Future prospects are assessed as *Favourable*, a pressure – PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats – has been identified acting on the habitat during this reporting cycle. PG03 was also identified as a future threat. With no conservation measures currently implemented for the habitat, and without additional surveying, the Future prospects of Structure and functions are assessed as *unknown*. As the short-term trends for parameters Range and Area are *stable*, and the short-term trend for parameter Structure and functions is *unknown*, the Overall trend in Conservation Status has been assessed as *stable*.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***129 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* *d) uncertain* ***e) unknown***
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	Sampling was undertaken within the SAC network between 2016 and 2017. Comparative analysis with previous surveys (Scally *et al*., 2020) showed there to be no change in the marine community types previously described and therefore the habitat was assessed as being in good condition. There have been no additional surveys concluded during this reporting cycle.

12 Complementary information *N/A*

Sandbanks (1110)

Article 17 (2019 - 2024)



NPWS An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra National Parks and Wildlife Service

0 25 50 km

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1130 Estuaries**
1.2i Habitat short name	**Estuaries**
1.3 Habitat description	The EU interpretation manual describes Estuaries as the downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. River estuaries are coastal inlets where, unlike 'Large shallow inlets and bays', there is generally a significant freshwater influence. Estuaries are an extremely diverse and dynamic habitat and play a major role in maintaining the health of coastal ecosystems. They support a mosaic of other habitats depending on their geomorphology and hydrology. Boulder and cobble beds frequently fringe the margins of estuaries, especially further upstream, and intertidal mudflats are often associated with the margins of estuaries where the tidal influence is stronger. Many estuaries in Ireland have been canalised and here the margins of the estuaries are often formed from concrete and other man-made materials. The estuarine bed or channel is subject, by various degrees, to the erosional forces of the outflowing river and is often characterised by coarse material, cobble or bedrock. However, in some estuaries muddy fine sands dominate. The topographical gradient of the estuary heavily influences the type of flanking material and the rate of deposition. One of the most important factors in the prevailing estuarine conditions is the degree of fresh and saltwater mixing and the rate at which this mixing occurs. Mixing is influenced by a number of factors including the size and shape of the inflowing river. This mixing is constantly changing as it also depends on the influence of wind, swell and the state of the tide. Seasonality plays an important role in the prevailing conditions of an estuary, with the amount of riverine water and seawater entering and exiting the habitat being subject to flux. In Ireland, winter floods can carry large volumes of water and their associated sediment load into an estuarine system while during the summer months the influence of freshwater and sediment loading can be less. The gradient in salinity along the system, from the mouth of the estuary to the limit of the tidal influence, dictates the diversity of species present along the length of the estuary. Sediment deposition on the estuary bed and suspended solids within the water column also greatly influence species distribution and abundance within the habitat. While increased turbidity of the waterbody can be caused by natural forces leading to the resuspension of bottom sediments, the dredging of estuary channels to facilitate navigation can also contribute to increased water turbidity in addition to the disturbance of benthic species. The size of estuaries in Ireland varies greatly from the 3 ha Easky Estuary in Co. Sligo to the Lower River Shannon Estuary of 242 km^2.

	The range of Marine Community Types (MCT) found within Estuaries is quite variable across Ireland. However, as the Lower River Shannon is by far the largest estuary in Ireland, representing 37% of the national resource, the MCTs which occur there have a dominant effect on the prevalence of MCTs within the habitat at a national scale. For example, the most prevalent community in this habitat is the Mud to fine sand community, where a third of the national resource of this community is within the Lower River Shannon SAC. The next most prevalent MCT habitat, recognised at around 30% of Estuaries, is Fine sand to sand, and again the largest proportion of the national resource is within the Lower River Shannon SAC. 20% of the remaining Estuaries habitat is identified as being Muddy sands/Sandy Muds Community and the greatest proportion of this community is found within the Lough Swilly SAC. Additional Annex I habitats such as Reefs (1170) are also found within this habitat. Estuarine habitats also form a significant resource for various bird and mammal species for feeding, breeding and resting.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2018***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	GIS mapping of Estuary habitat was primarily achieved by use of a dataset generated by the Environmental Protection Agency, in fulfilment of the Water Framework Directive, identifying transitional water bodies subject to freshwater influence. An additional 17 features (entire estuaries or sections of an estuary) missing from the 2019 dataset were added to the new version increasing the areal extent by 3,012 ha. In addition, any overlaps that occurred between an Estuary feature and an adjacent Lagoon feature were removed. Manual edits included the cross-reference of the Estuaries polygon data with the high water mark (HWM) polyline data delineated from the Tailte Éireann (formerly OSI) Prime 1 dataset to align the borders of the estuary file with the HWM. All edits were supplemented with reference and verification from the aerial ortho-imagery (Tailte Éireann MapGenie Imagery 2018). Smaller estuaries that were below the resolvable power of about 0.5 hectare were excluded from the polygon shapefile. This was supplemented by NPWS Site-Specific Conservation Objectives spatial data, where available.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/****NO***
3.3 Additional information	This habitat was first reported during the reporting cycle 2000 – 2006, and was based largely on expert opinion as no baseline surveys had been carried out at the time of reporting. *Additional sources of information:* Borja, Á., Franco, J. & Pérez, V. (2000) A marine biotic index to establish the ecological quality of soft-bottom benthos within European estuarine and coastal environments. *Marine Pollution Bulletin,* 40, 1100-1114. Borja, Á., Muxika, I. & Franco, J. (2003) The application of a Marine Biotic Index to different impact sources affecting soft-bottom benthic communities along European coasts. *Marine Pollution Bulletin*, 46, 835-845. CABI (2018) *Crassostrea gigas*. In: *Invasive Species Compendium*. Wallingford, UK: CAB International. www.cabi.org/isc. Lincoln, R.J. (1979) *British Marine Amphipoda: Gammaridea*. British Museum (Natural History). London 1979.
3.4 Sources of information	Aquafact International Services Ltd. (2006) A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks and Wildlife Service. 314pp. Aquatic Services Unit (2007) A Survey of Mudflats and Sandflats. A report to National Parks and Wildlife Service. CMRC (2006-12) Marine Irish Digital Atlas. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/. Crowe *et al*. (2011) A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks and Wildlife Service. Cummins *et al*. (2002) An assessment of the potential for the sustainable development of the Edible Periwinkle, *Littorina littorea*, Industry in Ireland. *Marine Resource Series,* 23. DCENR (2013) Spatial data for seismic surveys and hydrocarbon wells, Department of Communications, Energy and Natural Resources, http://gis.dcenr.gov.ie/internetIPAS/servlet /internet/IPAS2IHome. EPA Ireland GeoPortal. https://gis.epa.ie/getdata/download. Falvey, J.P., Costello, M.J. & Dempsey, S. (1997) A survey of intertidal mudflats. Unpublished report to the National Parks and Wildlife Service, Dublin.

	NPWS (2011/17) Conservation Objective Series. ISSN 2009-4086. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***16,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2007-2018***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2018***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 16,900 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other*	
4.13 Range when Directive came into force *Optional*	***15,100 km²***	
4.14 Additional information	The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This	

Optional	range is likely to encompass all geographical, geological and ecological variation of Estuaries. The range has not changed since the last reporting cycle as no further surveys of Estuaries have concluded during this reporting cycle. During the last reporting cycle, range was estimated based on partial data with some extrapolation and/or modelling. The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10x10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 10 km^2 LAEA grid. The number of 10x10 km grid cells intersected by the habitat has increased by six (from 163 to 169) in this reporting cycle; however, this is due to the addition of missing features and increased resolution of the mapping of Estuaries.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2007-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***790 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	

5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***1994-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 790 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	

	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ Other	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The Favourable Reference Area (FRA) is set as the current area as there is no evidence of a decline since the Directive came into force and it is considered adequate to ensure the long-term viability of the habitat.	

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***184.9 km²***
		Maximum	***184.9 km²***
	b) Area in not-good condition	**Minimum**	***605.1 km²***
		Maximum	***605.1 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species, taken from the last reporting cycle, includes the following species: *Baltidrilus costatus, Bathyporeia* spp*., Chaetozone gibber, Corophium volutator,* (*C. arenarium* in upper estuary), *Crangon crangon, Eteone longa, Fabulina fabula, Hediste diversicolor, Heteromastus filiformis, Limecola balthica, Nephtys cirrosa, Nephtys hombergii, Nucula nucleus, Owenia* spp., *Peringia ulvae, Pygospio elegans, Scrobicularia plana, Spio martinensis, Tharyx robustus, Thyasira flexuosa, Tubificoides benedii, Tubificoides pseudogaster, Capitella* species complex, *Streblospio* sp*.* and *Mytilus edulis.*
6.8 Additional information *Optional*	During the last reporting cycle, 56.9% of the national habitat resource was surveyed (Scally *et al.*, 2020) amounting to 433 km^2. Of that, 76.6% of the area surveyed was assessed as *Unfavourable-Inadequate* and 23.4% was *Favourable*. It was assessed that 178 km^2 of the national habitat resource was in good condition and 583 km^2 was in not-good condition, with a decreasing trend of habitat in good condition. Structure and functions were deemed to be *Unfavourable-Inadequate*, with *Poor* future prospects. Given the findings of these previous surveys, the increased surface area of Estuaries resulting from improved mapping, and that no further surveys of Estuaries have been concluded during this reporting cycle, it was assessed that 184.9 km^2 of the habitat is in good condition and 605.1 km^2 is in not-good condition, with a *stable* short-term trend direction. This reflects an assumption that the proportion of habitat in good and not-good condition remains the same, but that the area estimated for the national resource has changed as a result of surveys under the Water Framework Directive by the EPA.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	Medium
PE03 Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging)	Ongoing and likely to be in the future	Minority <50%	Low
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A

7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Environmental Protection Agency (EPA) (2024) Water Quality in 2023: An Indicators Report. EPA, Ireland. Available at: https://www.epa.ie/publications/monitoring–assessment/freshwater–marine/water-quality-in-2023-1.php Gerritsen, H.D. (2024) *Atlas of Commercial Fisheries around Ireland,* fourth edition. Marine Institute, Ireland. Hall, S.J. (1999) *Effects of fishing on marine ecosystems and communities (Fish and Aquatic Resources).* Wiley-Blackwell. 296pp. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
7.4 Additional information *Optional*	Pressures and threats were selected based on best expert judgement and an analyses of data from various sources related to the pressures observed. Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. A comprehensive analysis of pressures and threats, based on extensive data collection, was conducted during this reporting cycle. In order to assess pressure PG03, a robust methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018 – 2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion). During surveys undertaken during the last reporting cycle (Scally *et al.,* 2020), the main contributing factor to increased nutrient enrichment on estuarine waters was considered to be diffuse pollution as a result of agricultural and forestry activities and wastewater discharges. Data

	collected during this reporting cycle provide evidence of a continuation of this pressure (EPA, 2024). Spatial data were also collected from various other sources including assessments undertaken as part of the WFD programme and reporting to OSPAR in relation to dredging activities. *Crassostrea gigas* is present and may alter sediment dynamics and ecological balance. However, the incidence of this species make it currently a low threat at a national level.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats) MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	The main regulatory measure taken has been the implementation of Article 6.2 & 6.3 assessments to ensure that potential threats in relation to fisheries, aquaculture, and development activities, within and outside of the Natura 2000 network, do not negatively impact on the conservation objectives of Estuaries. Measures aimed at reducing diffuse pollution to surface and ground water from agricultural and residential activities (MA09, MA10) aim to improve water quality in estuarine waters; however, existing interventions appear insufficient to fully address the pressures impacting this habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable.* The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *stable*.	

	The Conservation Status of Structure and functions (including typical species) is *Bad.* The Future prospects of Structure and functions are therefore *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	***c) yes, due to improved knowledge/more accurate data***
	d) yes, due to the use of different method	***d) yes, due to the use of different method***
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change /* ***improved knowledge or more accurate data*** */ the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change /* ***improved knowledge or more accurate data*** */ the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	As water quality and fishing pressures are ongoing and pervasive, the precautionary approach was adopted and the specific Structure and functions were assessed as *Bad*, in accordance with reporting guidelines.	

	76.6% of the national habitat resource is assessed as being in not-good condition, based on extensive surveying carried out during the last reporting cycle. Without further surveying being carried out during this reporting cycle, given the pressures identified to be acting on the habitat, and the *stable* trend in habitat Structure and functions, the Overall conservation status of Estuaries has been assessed as *Bad*.

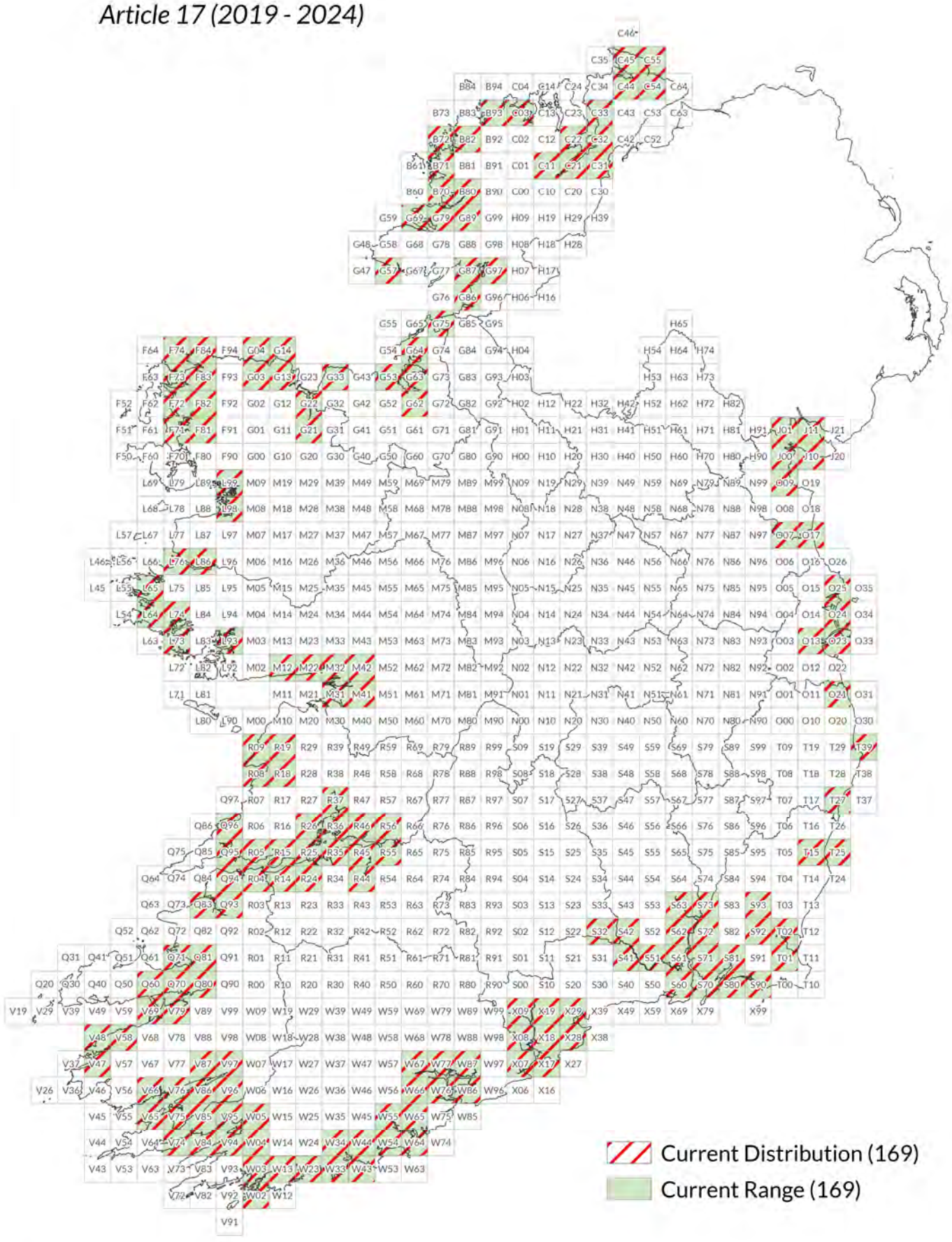
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***670 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.8 Additional information *Optional*	During the last reporting cycle, a total of 56.9% of the national resource of this habitat was surveyed. There have been no additional surveys reported during this six-year cycle. All surveys were undertaken in the SAC network, therefore the trend of Area in good condition reflects the national trend. The total area of the habitat within the SAC network is 670 km^2; this includes 135 km^2 in SACs where the Estuaries habitat is not listed as a qualifying interest (QI). The total area of the habitat that occurs in SACs where Estuaries is listed as a QI is 535 km^2.

12 Complementary information *N/A*

Estuaries (1130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1140 Mudflats and sandflats not covered by seawater at low tide**
1.2i Habitat short name	**Tidal mudflats and sandflats**
1.3 Habitat description	Mudflats and sandflats not covered by seawater at low tide are comprised of the intertidal section of the coastline where sands and muds dominate. They are dynamic ecosystems, dependent on the balance of natural accretion and erosion. The fundamental building block of this habitat is sediment ranging from around 1 micron to 2 millimetres. The finer silt and clay sediments are dominant in mudflats and the larger sand fractions are associated with areas exposed to significant wave energy. The fine sediment of intertidal mudflats is most often associated with rivers. The limit of tidal ingress often coincides with the beginning of flanking mudflat habitats. The competing forces of seaward-flowing freshwater meeting the flooding tide reduces net flow velocity, and consequently the carrying capacity for sediment, leading to deposition. A range of physical pressures operate in these habitats including dynamic fluctuations in salinity, temperature, and immersion. Small sediment grains can be very closely packed and the consequent minimal exchange of water may lead to oxygen deprivation of underlying sediments. Sandflats associated with larger estuaries are frequently shaped by locally generated or coastal wind-waves. The force required to dislodge sediment is dependent on the mass and cohesion of the material. Smaller, lighter fractions are easily removed and become less dominant in areas exposed to wind waves. However, the packing arrangement of larger grained material allows space between grains for accumulations of finer material. This can produce cohesive and extensive flats not susceptible to eroding forces. Due to the relatively low gradient of the sandflat wave energy is dissipated over a greater surface area. The combination of grain sizes also leads to a high retention of water within the flats producing a fairly stable physical environment with good biological productivity. In areas exposed to large waves with little or no source of riverine material, the habitat is often characterised by large grains resulting from erosion or long-shore drift. Without a source of binding fine sediments, these coarse sands are susceptible to frequent mobilization. The packing arrangement also allows for a free-draining habitat. These coarse beaches are consequently not only susceptible to marine forces but can be mobilized by wind to form coastal habitats such as sand dunes. The degree of mobility and harsh physiological conditions poses a significant challenge to marine flora and fauna. The type of biological communities found in Mudflats and sandflats is quite variable across Ireland. Currently, approximately 50% of the national resource of this habitat has been analysed as part of baseline mapping to set conservation objectives.

	The most prevalent community identified through this process was the Mud to Fine Sand community. 44% of the national resource of this community was within Lower River Shannon SAC. The next most prevalent broad community type recognised at around 40% of the habitat resource was Fine Sand to Sand community, and again the largest proportion of the national resource of this community was within Lower River Shannon SAC. The largest contribution of the remaining habitat was identified as being Muddy sands/Sandy muds Community. The most abundant macrofaunal species in this habitat are burrowing bristle worms and bivalves. The only vascular plant associated with this habitat is the mainly intertidal eelgrass *Zostera noltei* and this species is found within a number of SACs. The bivalve *Barnea candida,* also known as White Piddock, is rarely recorded in Ireland and is recorded from the intertidal at Bannow Bay SAC and Galway Bay Complex SAC.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2018***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	GIS mapping of Mudflats and sandflats habitat was primarily achieved using the high water mark (HWM) and Low Water Mark (LWM) polyline data delineated from the Tailte Éireann (formerly OSI) Discovery Series (1: 50,000). This was validated and refined by the use of the national aerial ortho-imagery published by Tailte Éireann in 2018. Smaller polygons that were below the resolvable power of about 0.5 hectare were excluded from the polygon shapefile dataset. This was supplemented by NPWS Site-Specific Conservation Objectives spatial data where available. Manual edits were carried out based on expert opinion.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/**NO***
3.3 Additional information	This habitat was first reported on for the reporting cycle 2000-2006. Borja, Á., Franco, J. & Pérez, V. (2000) A marine biotic index to establish the ecological quality of soft-bottom benthos within European estuarine and coastal environments. *Marine Pollution Bulletin,* 40, 1100-1114. Borja, Á., Muxika, I. & Franco, J. (2003) The application of a Marine Biotic Index to different impact sources affecting soft-bottom benthic communities along European coasts. *Marine Pollution Bulletin,* 46, 835-845. Lincoln, R.J. (1979) *British Marine Amphipoda: Gammaridea*. British Museum (Natural History). London 1979.
3.4 Sources of information	Aquafact International Services Ltd. (2006) A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks and Wildlife Service. Aquatic Services Unit (2007) A Survey of Mudflats and Sandflats. A report to National Parks and Wildlife Service. CMRC (2006-12). CMRC (2006-12) Marine Irish Digital Atlas. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/ Crowe *et al*. (2011) A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks and Wildlife Service. Cummins *et al*. (2002) An assessment of the potential for the sustainable development of the Edible Periwinkle, *Littorina littorea*, Industry in Ireland. *Marine Resource Series,* 23. DCENR (2013) Spatial data for seismic surveys and hydrocarbon wells, Department of Communications, Energy and Natural Resources, http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome. EPA Ireland GeoPortal. https://gis.epa.ie/getdata/download. Falvey, J.P., Costello, M.J. & Dempsey, S. (1997) A survey of intertidal mudflats. Unpublished report to the National Parks and Wildlife Service, Dublin. NPWS (2011/17) Conservation Objective Series. ISSN 2009-4086. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***22,600 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2007-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 22,600 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: <u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">15,900 km².
The Favourable Reference Range (FRR) has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of Mudflats and sandflats not covered by seawater at low tide. The data available are better than when the Directive came into force but the actual habitat has not altered significantly.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was estimated based on partial data with some extrapolation and/or modelling.
The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10x10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 10 km^2 LAEA grid.</td></tr>
</table>

	The range of this habitat feature has changed in Ireland since the last reporting period due to improved mapping. The number of 10x10 km grid cells intersected by the habitat has decreased from 238 to 226 in this reporting cycle. However, this is due to the refinement of the polygon data submitted in the last reporting cycle to more accurately delineate the mudflat and sandbank features observed on the aerial ortho-imagery in some regions. FRR was considered to be the same as the current range as there is no evidence of decline since the Directive came into force.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2007-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***616 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2007-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	

5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***1994-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 616 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	In 2007, the national resource was reported as 566.3 km^2. The area currently calculated in 2025 during this reporting cycle is 616 km^2. However, this represents a refinement and improvement in mapping techniques rather than a change in the national resource. The Favourable Reference Area (FRA) is set as the current area as there is no evidence of a decline since the Directive came into force and this is considered adequate to ensure the long-term viability of the habitat.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***271 km²***
		Maximum	***271 km²***
	b) Area in not-good condition	**Minimum**	***345 km²***
		Maximum	***345 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2007-2018***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species has not changed in comparison to the previous reporting period. The list of typical species includes: *Arenicola marina, Baltidrilus costatus, Bathyporeia pilosa, Bathyporeia sarsi, Cerastoderma edule, Chaetozone gibber, Corophium volutator, Crangon crangon, Eteone longa, Eurydice pulchra, Fabulina fabula, Hediste diversicolor, Heteromastus filiformis, Limecola balthica, Macomangulus tenuis, Nephtys cirrosa, Nephtys hombergii, Nucula nucleus, Peringia ulvae, Pisione remota, Pontocrates* spp., *Pygospio elegans, Scolelepis squamata, Scrobicularia plana, Scoloplos armiger, Spio martinensis, Tubificoides benedii.*
6.8 Additional information *Optional*	During the last reporting cycle, 49% of the national habitat resource was surveyed. Of that, 56% of the area surveyed was assessed as *Unfavourable-Inadequate* and 44% was *Favourable*. It was assessed that 285 km^2 of the national habitat resource was in good condition and 361 km^2 was in not-good condition, with a *decreasing* trend of habitat in good condition. Using the Structure and functions criteria in the Annex E evaluation matrix would have resulted in the habitat being assessed as *Unfavourable-Bad* in the last reporting period; however, it was noted that this did not accurately reflect the conditions at a site level and highlighted the difficulties of using area to assess Structure and functions in an aquatic environment. For this habitat, therefore, the more accurate assessment of Structure and functions was deemed to be *Unfavourable-Inadequate*, with *Poor* future prospects. Given the findings of these previous surveys, the improved calculation of surface area of Mudflats and sandflats resulting from mapping refinement, and that no further surveys of the habitat have concluded during this reporting cycle, it was assessed that 271 km^2 (44%) of the habitat is in good condition and 345 km^2 (56%) is in not-good condition, with a *stable* short-term trend direction. The same approach was taken in the current reporting period as the last, in relation to assessing Structure and functions as *Unfavourable-Inadequate* rather than *Unfavourable-Bad*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Majority 50-90%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Environmental Protection Agency (EPA) (2024) Water Quality in 2023: An Indicators Report. EPA, Ireland. Available at: https://www.epa.ie/publications/monitoring–assessment/freshwater–marine/water-quality-in-2023-1.php. Gerritsen, H.D. (2024) Atlas of Commercial Fisheries around Ireland, fourth edition. Marine Institute, Ireland. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
7.4 Additional information *Optional*	Pressures and threats were selected based on best expert judgement and an analysis of data from various sources related to the pressures observed. Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. Nutrient enrichment of enclosed bays with poor mixing was particularly evident during surveys undertaken during the last reporting cycle (Scally *et al.,* 2020). The main contributing factor to increased nutrient enrichment on the intertidal flats was considered to be diffuse pollution as a result of agricultural and forestry activities

	and wastewater discharges. Data collected during this reporting cycle provides evidence of a continuation of this pressure (EPA, 2024). Surveys conducted during the last reporting cycle noted that effective loss of the habitat area of Mudflats and sandflats not covered by seawater at low tide was being driven by the expansion in bottom culture of oysters. Compaction of sediments within the intertidal area as a result of machinery associated with oyster bottom culture driving over intertidal flats and litter associated with this industry was also frequently noted. In order to assess pressure PG03, a methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018 – 2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion). *Crassostrea gigas* is present and may alter sediment dynamics and ecological balance. However, the incidence of this species make it currently a low threat at a national level.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats) MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	The main regulatory measure taken has been the implementation of Article 6.2 and 6.3 assessments to ensure potential threats from development activities, within and outside of the Natura 2000 network, do not negatively impact on the conservation objectives of Mudflats/sandflats. The River Basin Management Plans for Ireland 2018-2021 and 2022-2027 set out the actions that Ireland takes to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027. The impact of bottom fishing activities pose a pressure on the Structure and functions of this habitat.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *stable*. Conservation status of Structure and functions is *Unfavourable-Inadequate*. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*

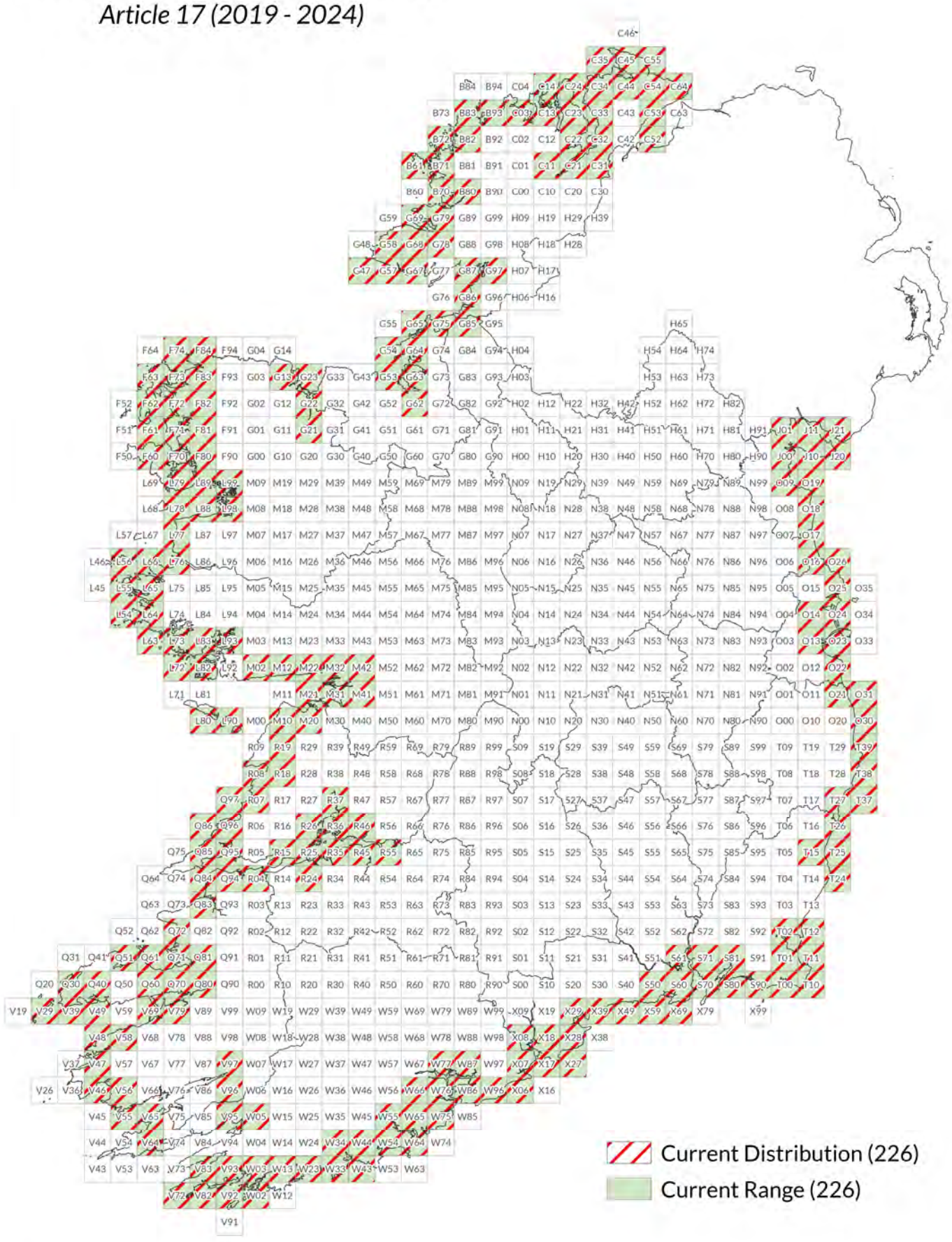
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	***c) yes, due to improved knowledge/more accurate data***
	d) yes, due to the use of different method	***d) yes, due to the use of different method***
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change /* ***improved knowledge or more accurate data /*** *the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	During the last reporting cycle, 49% of the total national resource of Mudflats and sandflats not covered by seawater at low tide, within 21 Special Areas of Conservation (SACs) around the coast of Ireland, were surveyed to assess the Structure and functions of this habitat during the previous reporting period. Of that, 56% of the area surveyed was assessed as *Unfavourable-Inadequate* and 44% was *Favourable*. Given the findings of the previous survey, that no further surveys have concluded during this reporting cycle, and the improved calculation of surface area of Mudflats and Sandflats resulting from mapping refinement, it was assessed that the proportions of habitat in good condition (44%) and not-good condition (56%) would remain the same for this reporting cycle. The same approach was taken as in the previous reporting period in assessing Structure and functions. In the absence of additional surveys, given the pressures identified, and that Future prospects of Structure and functions were assessed as *Poor*, using expert judgement, it was assessed that the Structure and functions of this habitat are *Unfavourable-Inadequate*. Therefore, the Overall conservation status of Mudflats and sandflats not covered by seawater at low tide was assessed as *Unfavourable-Inadequate.*	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***515 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	All surveys undertaken during the last reporting cycle were undertaken in the SAC network, and given that no further surveys have concluded during this reporting cycle, the trend of Area in good condition reflects the national trend.	

12 Complementary information *N/A*

Tidal mudflats and sandflats (1140)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1150 Coastal lagoons***
1.2i Habitat short name	**Lagoons**
1.3 Habitat description	Lagoons are expanses of coastal salt water, of varying salinity, which are wholly or partially separated from the sea. There are five morphological lagoon types in Ireland and, with the exception of karst lagoons which are confined to mid-west and rock/peat lagoons to the west and north-west, they occur all around the coast. The type of lagoon may determine the typical species found within it, to a certain extent. Numerically, artificial lagoon is the most common type and represents 33.3% of the habitat area. The classic 'sedimentary' lagoons with a sedimentary barrier represent the highest proportion of the habitat area (43.8%). These may or may not have a permanent tidal inlet but more than half of these have a barrier of cobbles rather than sand or shingle; this is considered unusual in Europe. Nineteen lagoons (20.1% of habitat area) are referred to as the 'rock/peat' lagoons. These lagoons, which are found on the west coast, are high-salinity lagoons with rock barriers similar to the Scottish 'obs' and are a particularly unusual type of lagoon in European terms. Eleven relatively small lagoons (1.7% of habitat area) are referred to as 'karst' lagoons and are found in the limestone areas of Counties Clare and Galway. They may have a permanent tidal inlet and even a cobble barrier but many are some distance from the sea with no visible connection to it. All receive both fresh and seawater through subterranean fissures in the bedrock. Finally, there are a small number (six lagoons, 1.1% of habitat area) referred to as 'saltmarsh' lagoons, and these are very much like very large permanent saltmarsh pools.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1996-2025***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*

2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	-

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Anon. (2011) Sampling fish for the Water Framework Directive: WFD Summary Report 2010. Inland Fisheries Ireland. Anon. (2012) Sampling fish for the Water Framework Directive: WFD Summary Report 2011. Inland Fisheries Ireland. AQUAFACT & Roden Oliver Associates. (2017) Monitoring and assessment of Irish lagoons for the purpose of the EU Water Framework Directive, 2016–2017. Unpublished report for the Environmental Protection Agency. Climate Change Advisory Council. (2024) Annual review 2024: Biodiversity and climate. https://www.climatecouncil.ie/councilpublications/annualreviewandreport/AR24-Biodiversity-final.pdf Cronin Millar (2012) Technical report on Reenydonegan Lake coastal bar breach, Bantry, Co. Cork. Cronin Millar Consulting Engineers. Department of Housing, Local Government and Heritage (2019) Biodiversity climate change sectoral adaptation plan. National Parks and Wildlife Service. https://www.npws.ie/news/biodiversity-climate-change-sectoral-adaptation-plan Environmental Protection Agency (2023) Water quality in Ireland: Status, trends, pressures and policies. https://www.teagasc.ie/media/website/environment/climate-action/climate-centre/Water-Quality-in-Ireland—Status-Trends-Pressures-and-Policies.pdf. Environmental Protection Agency (2024) Water quality and agriculture. https://www.epa.ie/environment-and-you/freshwater-and-marine/water-quality-and-agriculture/. Good, J. A. & Butler, F. T. (1996) A survey of Irish coastal lagoons. Ecotonal Coleoptera (Staphylinidae and Carabidae). Dúchas. Good, J. A. & Butler, F. T. (1998) Coastal lagoon shores as a habitat for Staphylinidae and Carabidae (Coleoptera) in Ireland. *Bulletin of the Irish Biogeographical Society*, 21, 22–65.

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4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***6,700 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 6,700 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	

	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high**/moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	***6,700 km²***	
4.14 Additional information *Optional*	The calculation of range was refined for the 2007-2012 assessment using more accurate mapping and this value was also used for the current assessment. As there is no evidence of a true change since the Directive came into force and there is no reason to assume that the range is not large enough to allow for the long-term survival of the habitat, the current range is set as the Favourable Reference Range. Range is stable and not smaller than the Favourable Reference Range and is therefore assessed as *Favourable*.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2012-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***24.2 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.15 Favourable reference area	***a) 24.2 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	***24.2 km²***	
5.17 Additional information *Optional*	The calculation reference area was refined for the 2007-2012 assessment using more accurate mapping and this value was also used for the current assessment. As there is no evidence of a true change since the Directive came into force and there is no reason to assume that the reference area is not large enough to allow for the long-term survival of the habitat, the current area is set as the Favourable Reference Area. Area is stable and not smaller than the Favourable Reference Area and is therefore assessed as *Favourable*.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***3.68 km²***
		Maximum	***3.68 km²***
	b) Area in not-good condition	**Minimum**	***20.56 km²***
		Maximum	***20.56 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* ***c****) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***
6.7 Typical species Method used *Optional*	The list of typical species has not changed in comparison to the previous reporting period and includes the following species: *Chara canescens, Chara baltica, Chara connivens, Lamprothamnium papulosum, Palaemon adspersus* and *Ruppia maritima*.
6.8 Additional information *Optional*	A lagoon in *Favourable* condition, as determined by the site-specific conservation objectives (https://www.npws.ie/protected-sites), is said to have a median annual salinity and temporal variation within natural range; annual water level fluctuations and minima within natural range; appropriate hydrological connections between lagoons and sea including, where necessary, appropriate management; annual median chlorophyll a within natural ranges and <5 µg/l (or <2.5 µg/l in one case); annual median MRP within natural ranges and <0.1 mg/l (or <0.01 mg/l in one case); annual median DIN within natural ranges and less than 0.15 mg/l, macrophyte colonisation to maximum depth for shallow (<2 m) lagoons or to >2 m (or >4 m) for all other lagoons; maintain number and extent of listed plant lagoonal specialists, subject to natural variation, maintain listed animal lagoonal specialists, subject to natural variation, and negative indicator species absent or under control. As reported in 2019, the main reason that sites failed the Structure and functions assessment was predominantly water quality followed by barrier condition (Roche *et al*., in prep.). The EPA CLEAR Lagoon project recently concluded its study of Lady's Island Lake (a lagoon) in Wexford (O'Connor *et al*., 2025). This research conducted a suite of investigations into the reasons for the decline of the lagoon and compared the results with a less-impacted saline lagoon. The results

	show severe degradation in Lady's Island Lake, with more than 10 times higher chlorophyll a levels. During the last reporting cycle, 366.01 ha (15.1% of the total habitat area) was rated as *Favourable*, 924.24 ha (38.13% of the total habitat area) was rated as *Unfavourable-Inadequate* and 1,133.67 ha (46.77% of the total habitat area) was rated as *Unfavourable-Bad*. As the pressures persist and without additional surveying of the full national resource, using this assessment method, 3.66 km^2 (15.1%) is assessed as being in good condition and 20.58 km^2 (84.9%) is assessed as being in not-good condition. A survey was also undertaken of Scattery Lagoon (0.02 km^2) during this reporting cycle (2024) and was concluded as being in *Favourable* condition as the lagoon barrier had begun to naturally reinstate itself and become revegetated; thus, 3.68 km^2 of the national resource is now assessed as being in good condition and 20.56 km^2 is assessed as being in not-good condition. Furthermore, as the condition of the habitat area in not-good condition continues to deteriorate, the short-term trend direction for Structure and functions is assessed as *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing	Whole >90%	High
PK02 Mixed source marine water pollution (marine and coastal)	Ongoing	Whole >90%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing	Whole >90%	High
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing	Whole >90%	High
PL06 Physical alteration of water bodies (mixed or unknown drivers)	Ongoing	Whole >90%	High

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-

7.4 Additional information *Optional*	Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. Coastal lagoons in Ireland are subject to a range of ecological pressures and threats that compromise their conservation status and ecological integrity. Key pressures include nutrient enrichment from agricultural runoff and wastewater discharges, which contribute to eutrophication, algal blooms, and oxygen depletion (EPA, 2024). Hydrological alterations, such as artificial openings or barriers at lagoon inlets, disrupt natural salinity regimes and water exchange, affecting species composition and habitat structure. Invasive species, particularly non-native aquatic plants and fish, further threaten native biodiversity. Physical habitat disturbance from adjacent land use changes, drainage, and recreational activities can lead to habitat fragmentation and sedimentation. Climate change compounds these pressures by altering precipitation patterns, sea levels, and temperature regimes, with implications for lagoon connectivity and ecological balance. These cumulative impacts pose significant challenges to achieving and maintaining favourable conservation status for habitat type 1150 (Coastal lagoons) under the EU Habitats Directive. The 2019 NCA also noted recent declines due to siltation of lagoons with peaty silt in parts of the west, especially Connemara, in previously High/Good-quality oligotrophic lagoons. *Spartina* sp. and *Sargassum muticum* were recorded in field observations but they are not considered to represent a threat at a national level at this time.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct MK01 Reduce impact of mixed source pollution MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	Results from the CLEAR Lagoon project that focused on Lady's Island Lake in Wexford (O'Connor *et al*., 2025) show severe degradation, with over 10 times higher chlorophyll a levels. Runoff of excessive nutrient inputs of nitrogen and possibly phosphorus from agriculture are identified as the main cause of eutrophication. A proposal to replace sea barrier breaching with a pipe also poses a serious risk to reducing lagoonal salinity. The research proposes a range of remedial measures to protect and improve the benthic quality of Lady's Island Lake and other saline lagoons in Ireland.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	In relation to hydrographic functioning, there is potential to control anthropogenic impacts. For some sites (Tacumshin, Shannon, Lough Donnell, Maghery and Lady's Island Lake), issues of drainage and hydrology have arisen but progress to resolve them is slow. The most widespread issue concerning lagoons is water quality. All lagoons on the south and east coasts showed evidence of eutrophication ranging from moderate to very severe and there has been no improvement in this situation since 2007. Occasional algal blooms in lagoons are typically a natural process, especially in response to a change in salinity and the addition of a limiting nutrient, such as phosphate in seawater; this may trigger a bloom when mixed with nitrate-rich river water. However man-made blooms can be almost permanent and can result in obvious fish-kills. These appear to be a much more recent phenomenon, probably associated with intensification of agricultural practices within the catchment of watercourses entering lagoons. As a consequence, Future prospects must be considered *Unfavourable-Bad*.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*

	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range and Area are *Favourable* in this reporting period, as they were in the previous reporting period. The Conservation Status of Structure and functions and Future prospects are *Unfavourable-Bad* in this reporting period, as they were in the previous reporting period. The Overall assessment of Conservation Status for the current reporting period is *Unfavourable-Bad*, as it was in the last reporting period.	

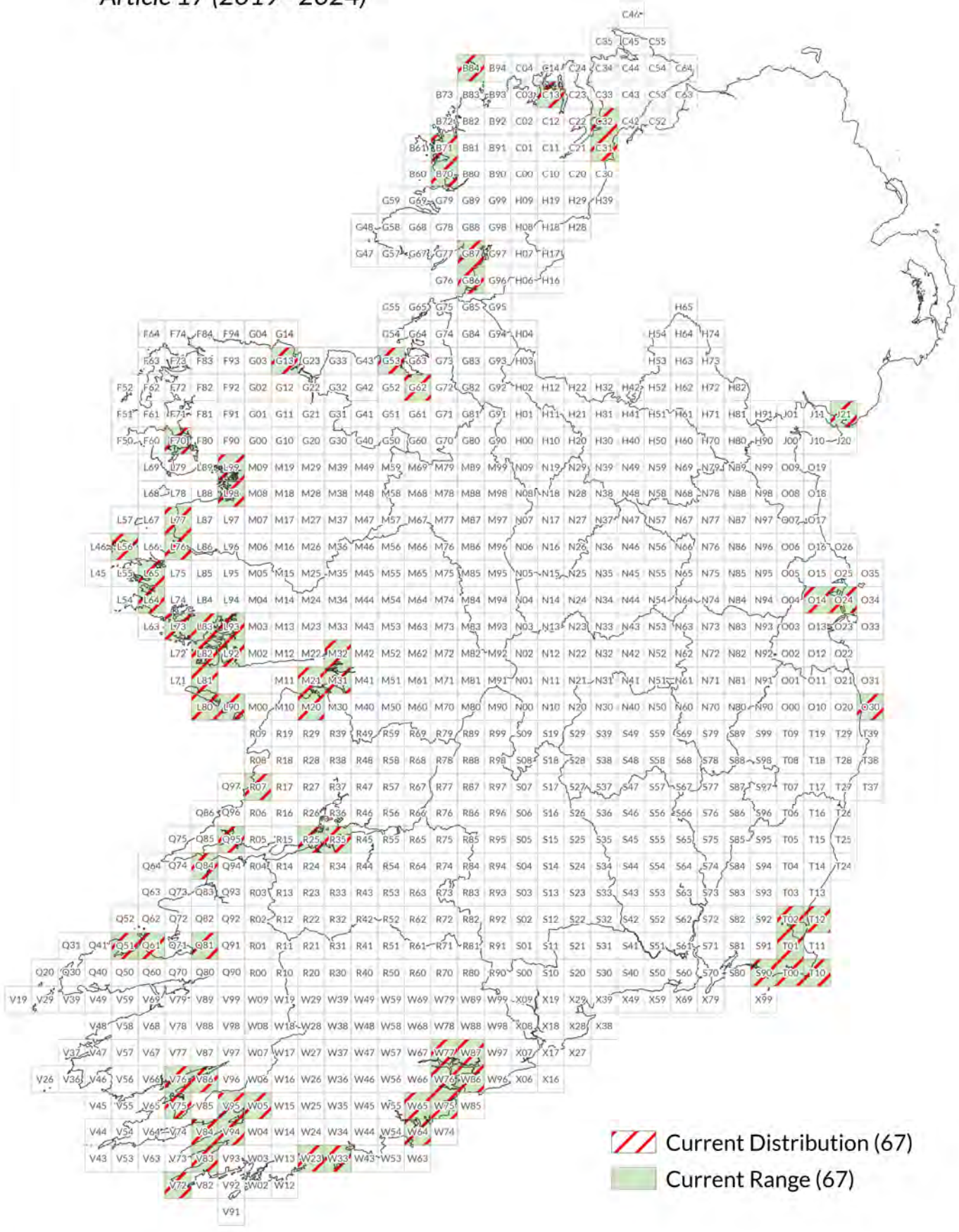
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***22.03 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Although the National Lagoon Habitat Monitoring Programme is still underway, all indications on a site-by-site level suggest that there is a continuing deteriorating trend in habitat quality.

12 Complementary information *N/A*

Lagoons* (1150)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1160 Large shallow inlets and bays**
1.2i Habitat short name	**Large shallow inlets and bays**
1.3i Habitat description	The EU interpretation manual describes Large shallow inlets and bays as indentations of the coast where, in contrast to estuaries, the influence of freshwater is generally limited or reduced. These habitats are typically shallower and more sheltered than open coasts. They generally constitute a large physiographic feature that may wholly or partially incorporate other Annex I habitats including, for example, Mudflats and sandflats not covered by seawater at low tide, Estuaries and Reefs. Large shallow inlets and bays vary widely in habitat and species diversity depending on their location, exposure, geology and sediment composition, which determine their constituent habitat communities. They are host to a range of soft sediment benthic communities. The three most prevalent sediment communities which account for 70% of the examined habitats of Large shallow inlets and bays in Ireland include: Fine Sand to Sand community, Mud to Fine Sand Community and Muddy Sands/Sandy Muds Community. A very significant proportion of keystone species, as understood to form ecological communities of significance in Ireland, are found within the boundaries of Large shallow inlets and bays including 85% of mapped maërl (*Lithothamnion corallioides* and *Phymatolithon calcareum*) and 70% of mapped eelgrass beds (*Zostera marina* and *Z. noltei*). A number of rare and/or unusual species also occur in this habitat including the rare anemones, *Edwardsia delapiae* and *Pachycerianthus multiplicatus*; the majority of sensitive subtidal species such as *Neopentadactyla mixta*, *Sabella pavonina*, *Virgularia mirabilis* and *Limaria hians* also occur within this habitat. The remainder of this habitat is variously composed of hard substrate communities including geogenic subtidal and intertidal reef and sea caves. A diverse range of reef communities reflective of the exposure regime are found within this habitat in Ireland. Geogenic intertidal reef, ranging from exposed to sheltered shores, dominates a high proportion of the landward margins of Large shallow inlets and bays, especially on the west coast of Ireland. Depending on exposure, intertidal reef habitats are characterised by sheltered fucoid-dominated shores to exposed mussel (*Mytilus edulis*) and barnacle-dominated shores. Intertidal reef is frequently found in continuum with subtidal reef and there is a marked zonation from shallow infralittoral to deep circalittoral reef communities. Subtidal reef is also found throughout the habitat and is characterised by bedrock or cobble and boulder fields.

	Biogenic reef habitats formed from mussels (*M. edulis*) and the honeycomb worm (*Sabellaria alveolata*) are also present in the intertidal areas of this habitat. Submerged or partially submerged sea caves are common around the coast of Ireland. This poorly known habitat hosts a range of distinct communities which vary considerably from the surrounding reef habitats. Large shallow inlets and bays also form an important resource for various bird and mammal species (including Annex II marine mammals) for feeding, breeding and resting.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The primary source of data in relation to Large shallow inlets and bays in Ireland was the high water mark (HWM) polyline data delineated from the Tailte Éireann (formerly OSI) Prime 1 dataset (1:10,000), which delineated the inner boundary of the LSIB feature. The Environmental Protection Agency Coastal Waterbody area, defined under the Water Framework Directive, was used to delineate the outer boundary of the habitat [1160] feature. This was supplemented by NPWS Site-Specific Conservation Objectives spatial data where available. Manual edits involved the removal of artefacts (artificial/false features) arising from the union of the lower resolution Special Area of Conservation file (1:50,000) with the higher resolution habitat file during the process to determine the proportion of habitat [1160] within the SAC.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/****NO***
3.3 Additional information	This habitat was first reported during the reporting cycle 2000 – 2006 and was based on extensive surveying. Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northern, K.O. & Reker, J.B. (2004) The Marine Habitat Classification for Britain and Ireland Version 04.05. JNCC, Peterborough ISBN 1 861 07561 8 (internet version). MERC (2005) Survey of sensitive subtidal benthic marine communities in Kilkieran Bay and Islands SAC and Kingstown Bay SAC. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2006) Survey of sensitive subtidal benthic marine communities in Slyne Head Peninsula SAC, Clew Bay Complex SAC and Galway Bay Complex SAC. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2007a) Survey of sensitive subtidal benthic marine communities in Roaringwater Bay and Islands SAC, Lough Hyne Nature Reserve and Environs SAC, Valentia Harbour/Portmagee Channel SAC and Broadhaven Bay SAC. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2007b) Survey of the distribution of the anemone *Edwardsia delapiae* (Carlgren and Stephenson, 1928) in Valentia Harbour and Portmagee Channel SAC, Co Kerry. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2008a) Survey of sensitive subtidal benthic marine communities in Mullet/Blacksod Bay Complex SAC, Rutland Island and Sound and Mulroy Bay SAC. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2009) Survey of sensitive subtidal benthic marine communities in Kenmare River SAC and Tralee Bay and Magharee Peninsula, West to Cloghane SAC. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. MERC (2014a) Trial monitoring of Roaringwater Bay and Islands SAC: Site monitoring report. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

	MERC (2014b) Trial monitoring of Roaringwater Bay and Islands SAC: Monitoring methodology report. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. Picton, B.E., Emblow, C.S., Morrow, C.C., Sides, E.M., Tierney, P., McGrath, D., McGeough, G., McCrea, M., Dinneen, P., Falvey, J., Dempsey, S., Dowse, J. & Costello, M.J. (1997) Marine sites, habitats and species data collected during the BioMar survey of Ireland.
3.4 Sources of information	Aquafact International Services Ltd. (2006) A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks and Wildlife Service. 314pp. Aquatic Services Unit (2007) A Survey of Mudflats and Sandflats. A report to National Parks and Wildlife Service. 253pp. Cameron & Askew (Eds.) (2011) EUSeaMap - Preparatory Action for development and assessment of a European broad-scale seabed habitat map final report. Available at https://emodnet .ec.europa.eu/sites/emodnet.ec.europa.eu/files/public /20110228_finalreport_euseamap_v28.pdf. CMRC (2006-12) *Marine Irish Digital Atlas*. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/. Crowe *et al*. (2011) A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks and Wildlife Service. 99pp. DCENR (2003) Coast of Ireland, 2003 Oblique Imagery Survey Viewer, Department of Communications, Energy and Natural Resources, https://www.floodinfo.ie/map/coastal_map/. EPA Ireland GeoPortal. https://gis.epa.ie/getdata/download. Falvey, J.P., Costello, M.J. & S. Dempsey (1997) A survey of intertidal mudflats. Unpublished report to the National Parks and Wildlife Service, Dublin. 258pp. MERC (2005-2009) Surveys of sensitive sublittoral benthic communities. Reports to National Parks and Wildlife Service. MERC (2010) Irish Sea Reef Survey. A report to National Parks and Wildlife Service. 32pp. NPWS (2010) A desk study of intertidal sea caves. Unpublished report. Scally, L., Pfeiffer, N.J., and Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***20,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="3"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td colspan="2"></td></tr>
<tr><td>b) Maximum</td><td colspan="2"></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="3">a) 20,900 km²</td></tr>
<tr><td colspan="3">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="3">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="3">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td colspan="2">☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="3">☐ Expert opinion</td></tr>
<tr><td colspan="3">☐ Other</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="3"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="3">The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of Large shallow inlets and bays.</td></tr>
</table>

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2007-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***4,665 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="3">1994-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="3"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td colspan="2"></td></tr>
<tr><td>b) Maximum</td><td colspan="2"></td></tr>
<tr><td>c) Confidence interval</td><td colspan="2"></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="3">a) 4,665 km²</td></tr>
<tr><td colspan="3">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="3">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="3">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td colspan="2">☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="3">☐ Expert opinion</td></tr>
<tr><td colspan="3">☐ <u>Other</u></td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	***4,929 km².*** Previous iterations of mapping were relying on inferred boundaries between habitats 1160 and 1130. The current boundaries are using data that was collected through salinity measurements to facilitate monitoring for the Water Framework Directive. The current estimate of area for 1160 is the most accurate that can be completed currently.
5.17 Additional information *Optional*	The Favourable Reference Area (FRA) is set as the current area as there is no evidence of a decline since the Directive came into force and this is considered adequate to ensure the long-term viability of the habitat. GIS mapping of Large shallow inlets and bays was primarily achieved by reference to a dataset generated by the Environmental Protection Agency in fulfilment of the Water Framework Directive requirement of identifying transitional and coastal water bodies. This dataset was generated by reference to salinity values and was digitised from the open coast by prominence of enclosing headlands. These data were cross-referenced against the high and low water marks/vectors delineated by the Tailte Éireann (formerly OSI) Prime 1 dataset (1:10,000). This was supplemented with reference and verification from the aerial ortho-imagery data set, where appropriate, published by Tailte Éireann in 2018. Minor changes to the distribution between the last reporting cycle and this one have resulted due to improved mapping and manual edits carried out based on expert opinion and the use of higher resolution data demarcating the High Water Mark.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***1,726 km²***
		Maximum	***1,726 km²***
	b) Area in not-good condition	**Minimum**	***2,939 km²***
		Maximum	***2,939 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2007-2018***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	This list of typical species has not changed since the previous reporting period and includes the following species: *Abra alba, Arenicola marina, Ampelisca brevicornis, Aonides oxycephala, Bathyporeia elegans, Bathyporeia guilliamsoniana, Bathyporeia pelagica, Bittium reticulatum, Caprellidae* spp., *Caprella acanthifera, Phtisica marina, Chamelea striatula, Chaetozone gibber, Crangon crangon, Diplocirrus glaucus, Donax vittatus, Euclymene oerstedii, Fabulina fabula, Hilbigneris gracilis, Iphinoe trispinosa, Kurtiella bidentata, Leptochiton asellus, Lithothamnion corallioides, Magelona filiformis, Magelona alleni, Magelona johnstoni, Mediomastus fragilis, Melinna palmata, Monocorophium sextonae, Nephtys cirrosa, Nephtys hombergii, Nucula nitidosa, Owenia* spp., *Pontocrates arenarius, Pygospio elegans, Pholoe baltica, Pisidia longicornis, Phymatolithon calcareum, Scoloplos mesnili, Scoloplos armiger, Sigalion mathildae, Socarnes erythrophthalmus, Spio symphyta, Spio martinensis, Spiophanes bombyx, Spirobranchus lamarcki, Spirobranchus triqueter, Tellina fabula, Terebellides stroemi, Thracia phaseolina* and *Thyasira flexuosa*.
6.8 Additional information *Optional*	During the last reporting cycle, 1,690 km^2 of the total resource of 4,768 km^2 of Large shallow inlets and bays within 14 Special Areas of Conservation (SACs) around the coast of Ireland were surveyed to assess Structure and functions of this habitat (Scally *et al*., 2020). This represented 35% of the total national resource of this habitat and it was deemed to be representative of the national resource. Given the findings of these previous surveys, the increased surface area of Large shallow inlets and bays resulting from improved mapping, and that no further surveys of the habitat have concluded during this reporting cycle, it was assessed that 1,726 km^2 of the habitat is in good condition and 2,939 km^2 is in not-good condition, with a *decreasing* short-term trend direction.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Majority 50-90%	High

PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PG01 Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional)	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R04295 *Magallana gigas (=Crassostrea gigas),* R04358 *Crepidula fornicata,* R05100 *Didemnum vexillum,* *Undaria mutica.* These species are noted for their occurrence but they do not occur at a level that exerts even a low influence on the conservation status of the habitat.
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	EPA (2021) WFD Coastal Waterbody Status 2016 – 2021. Available at EPA Water Map: https://gis.epa.ie/EPAMaps/Water. Gerritsen, H.D. (2024) *Atlas of Commercial Fisheries around Ireland*, fourth edition. Marine Institute, Ireland. Hall, S.J. (1999) *Effects of fishing on marine ecosystems and communities (Fish and Aquatic Resources).* Wiley-Blackwell. 296pp. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data. The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
7.4 Additional information *Optional*	Pressures and threats were updated from 2019 and selected based on best expert judgement and an analysis of data from various spatial sources related to the pressures observed. Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance.

	Surveys conducted during the last reporting cycle noted nutrient enrichment as a significant pressure on the habitat, with loss of eelgrass beds also notable in some locations indicating a pressure occurring within the habitat (Scally et al., 2020). It was also observed that benthic dredging had been the most likely cause of loss of the *Serpula vermicularis* reef habitat within an area of Blacksod Bay. It should be noted that observations occurring in specific bays are not always relevant to all bays and that extrapolating data to a national conservation assessment is not without difficulty. A comprehensive analysis of pressures and threats, based on extensive data collection, was conducted during this reporting cycle. In order to assess pressure PG03, a robust methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018 – 2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion). Similar assays were undertaken to evaluate pressures on water quality and other commercial and recreational activity. These used significant resources collected as part of the Water Framework Reporting.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* ***c) Long-term response (after 2036)***
8.6 List of main conservation measures	MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats) MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	The main regulatory measure taken has been the implementation of Article 6.2 and 6.3 assessments to ensure potential threats in relation to fisheries, aquaculture and development activities, within and outside of the Natura 2000 network, do not negatively impact on the conservation objectives of Large shallow inlets and bays. The implementation of the following conservation measures, aimed at reducing diffuse pollution to surface and ground water from agricultural and residential activities, would improve the structure and function of this habitat: MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production The River Basin Management Plan for Ireland 2018-2021 & 2022-2027 set out the actions that Ireland takes to improve water quality and

	achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027. The implementation of the following conservation measure would improve the structure and function of this habitat, as bottom fishing activities pose a pressure on the Structure and functions of this habitat (Hall, 1999): MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats)

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*. Current Structure and functions are assessed as *Unfavourable-Bad.* Short-term trend direction of Structure and functions is *decreasing*. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. Future prospects of Structure and functions are therefore *Bad*.	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*

<table>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="7">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td><u>a) No, there is no difference</u></td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">63.2% of the national habitat resource was assessed as being in not-good condition, based on extensive surveying carried out during the last reporting cycle. Without further surveying being concluded during this reporting cycle, given the pressures identified to be acting on the habitat, and the deteriorating trend in habitat Structure and functions, the Overall conservation status of Large shallow inlets and bays has been assessed as Unfavourable-Bad.

A change in sediment composition, resulting in an increased proportion of fine grain size class, was recorded at three of the SACs surveyed. An increase in fines within a sediment is considered an indicator of increased sedimentation.

Significant changes were documented in the areas previously recorded for eelgrass beds between 2005 and 2009. In some SACs, the loss of entire eelgrass beds was recorded in a number of places (Mulroy Bay SAC, Valencia Harbour/Portmagee Channel SAC, Clew Bay Complex SAC and Mullet/Blacksod Bay Complex SAC). In these and other SACs a significant decrease in the abundance of eelgrass within a bed from the previous baseline survey was also recorded. An increase in negative indicators, e.g. epiphytic algal cover on eelgrass leaves, the presence of opportunistic species and invasive alien species, was also recorded in many of the eelgrass beds surveyed. Eelgrass beds are considered sensitive subtidal communities and pressures are likely to be noted in these communities prior to more resilient communities.

The Serpula vermicularis-dominated community complex in Blacksod Bay, which had previously (2008 survey) been shown to be comprised of large aggregations of biogenic reef formed by Serpula vermicularis, now consists of broken tubes of Serpula vermicularis. Very few living aggregations are still present and the total habitat area of this MCT has</td></tr>
</table>

	been negatively impacted. The cause of this impact is physical damage due to benthic dredging. Physical damage to maërl thalli was also observed in the maërl beds adjacent to the *Serpula vermicularis*-dominated community complex. Significant negative impacts were recorded in the maërl community within Roaringwater Bay SAC. Here pseudofaeces deposition and/or extensive algal cover over the maërl beds, including the rare *Lithothamnion dentatum,* were recorded in the vicinity of mussel longlines. The opportunistic ascidian *Ascidiella aspersa* was also recorded as "dominant" within the maërl beds in the immediate vicinity of the mussel longlines. A total of 0.29 ha or 23.99% of the total known national resource of the marine community type for the rare burrowing worm anemone *Edwardsia delapiae* within Valencia Harbour/Portmagee channel SAC has been lost. This has resulted from the indirect impact of the construction of a floating breakwater over this MCT leading to a negative change in the sediment requirements for this species. Minor increases in the habitat for *Pachycerianthus multiplicatus* were recorded in Kenmare River SAC and Kilkieran Bay and Islands SAC. However, these increases are considered to be the result of increased survey effort rather than an increase in species distribution. No significant increase in the extent of the area of other keystone species was recorded.

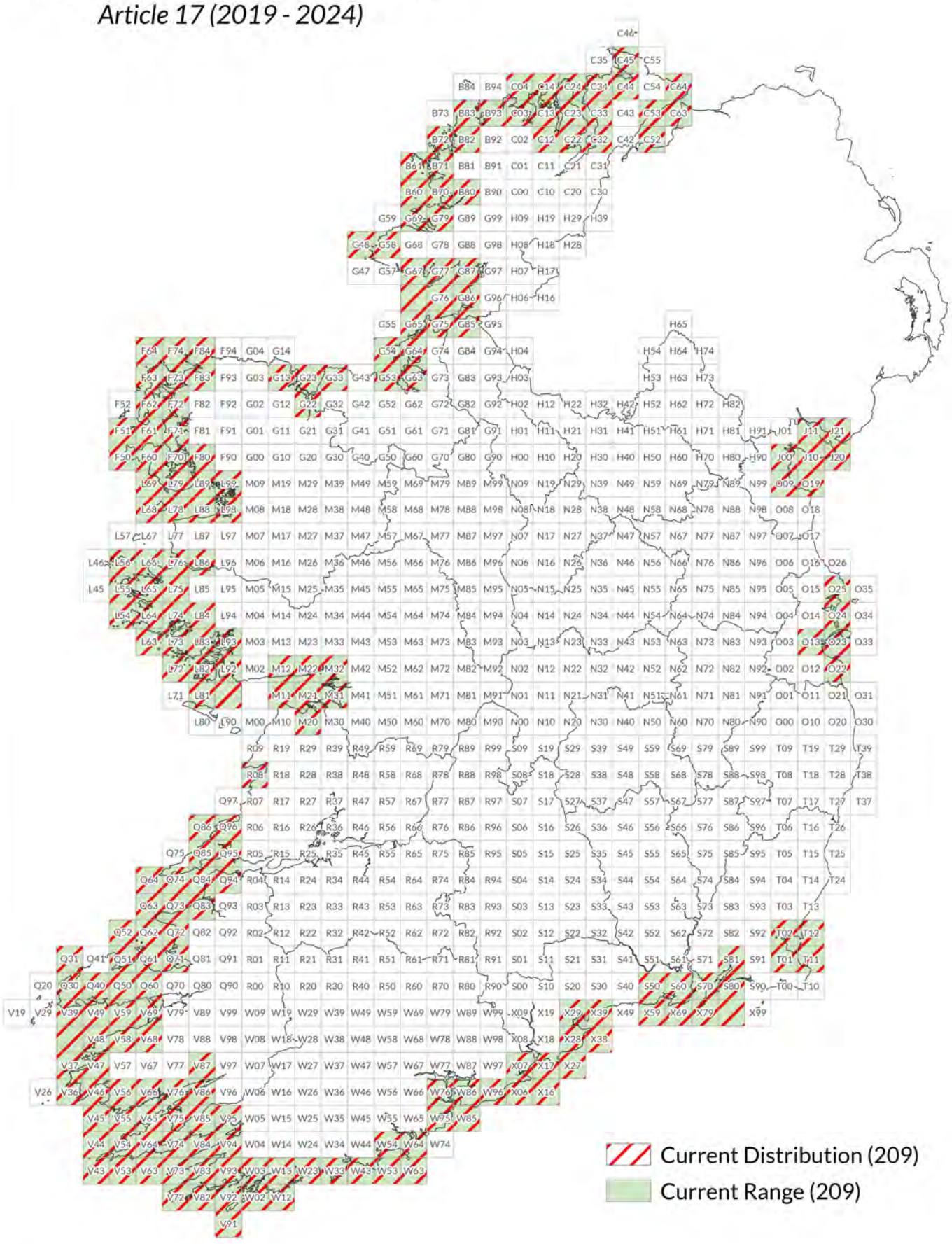
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2,149 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	-

12 Complementary information *N/A*

Large shallow inlets and bays (1160)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1170 Reefs**
1.2i Habitat short name	**Reefs**
1.3 Habitat description	Reef habitats are widespread marine features with immobile hard substrates available for colonisation by epifauna. Reef habitat in Irish waters ranges from the intertidal to 4,500 m below the sea surface and more than 400 km from the coast. Intertidal reefs are familiar and widespread habitats characterised by hard rock washed by the tide. There are a number of factors that influence this habitat type including tidal immersion, influence of freshwater (riverine and rainwater), variation in temperature, desiccation, exposure to waves, stability of substrate, and weathering of substrate. With distance from the intertidal, these parameters become less active in influencing the habitat. Subtidal reefs are most often found in exposed areas. In depths down to 30 m along the Atlantic margin, there is still significant penetration of light and swell waves reach the reef. In depths below 30m (or shallower in some coastal or transitional areas), insufficient light penetrates to hard rock structures to allow photosynthesis of algae and the habitat usually becomes dominated by fauna. In the offshore, hard rock structures occur intermittently between soft sediment, mostly along the shelf margin. In depths of several hundred metres, no light reaches the bottom and temperatures are usually cool and fairly constant. A notable type of reef habitat is that generated by the habitat-forming accretions of animals. These biogenic reefs increase the structural complexity beyond the surrounding areas and usually result in greater biodiversity. In the inshore, these may be formed by the protective structures of worms, and in the offshore, by stony deep-water coral species. Extensive surveying on Annex I marine habitats in the inshore (Scally *et al*., 2020), carried out during the last reporting cycle, has highlighted typical species or communities. Mulroy Bay, which is Ireland's only example of very sheltered reef, reported a few notable species including the sponges *Dercitus bucklandi, Stelletta grubii*, an undescribed species of *Polymastia* and the anthozoan *Parerythropodium corralloides*. Reef habitat in Kilkiernan showed some unusual presentations of the sponge and ascidian community, particularly in the Gurraig Sound, typified by the presence of the sponges *Esperiopsis fucorum*, *Haliclona simulans, Myxilla incrustans, Polymastia mamillaris, Raspailia* sp. and *Suberites* sp., *Plakortis simplex* and *Tricheurypon viride* and ascidians *Ascidiella aspersa*, *Ascidia mentula, Ciona intestinalis, Corella parallelogramma* and *Dendrodoa grossularia*. The occurrence of *Phakellia vermiculata* and *Axinella damicornis* is also notable. Similarly, in Kenmare River, rare species included the brachiopod *Neocrania anomala* and at Slyne

	Head, the nudibranch *Aldisa zetlandica*. The urchin *Paracentrotus lividus*, a once-typical intertidal reef species, now shows a restricted distribution with few records nationally. During surveys of offshore reefs (La Bianca *et al.,* 2018, 2019) conducted during the last reporting cycle, the depth range of the cold water coral *Solenosmilia variabilis* was found at previously unrecorded depths (>1600 m). On the Rockall Bank, a highly unusual accumulation of living and dead sponges forming a complex habitat was found. These areas of potential 'sponge reef' formations are very rare and have previously only been recorded in Canadian waters.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	Mapping of the habitat was carried out using a number of data sets, including those related to the incidence of coastal habitats, NPWS Site-Specific Conservation Objectives data, predicted and modelled habitat maps, hydrocarbon exploration, sustainable harvest, physical oceanographic surveys, geophysical and geotechnical surveys, and dedicated biological mapping using direct sampling and remote acquisition techniques. The primary source of data used to show the distribution of reef in waters less than 200 m was the rock feature layer from the Irish Sea Shelf Geomorphology Map (v2023). These features were extracted from high resolution bathymetric data (5 m) by examining bathymetric-derived variables that can indicate the presence of rock. These data, combined with the other data sources, provide a complete map of the distribution of reef habitat in Irish waters. Manual edits were carried out based on expert opinion.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/****NO***
3.3 Additional information	Additional sources of data: Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northern, K.O. & Reker, J.B. (2004) The Marine Habitat Classification for Britain and Ireland Version 04.05. JNCC, Peterborough, ISBN 1 861 07561 8 (internet version). Picton, B.E., Emblow, C.S., Morrow, C.C, Sides, E.M., Tierney, P., McGrath, D., McGeough, G., McCrea, M., Dinneen, P., Falvey, J., Dempsey, S., Dowse, J. & Costello, M.J. (1997) Marine sites, habitats, and species data collected during the BioMar survey of Ireland. Wells, E. (2006) Intertidal Coastal Waters Macroalgae – Rocky Shore Tool. *Water Framework Directive Marine Plants Task Team*. Version 3. Paper no. MPTT/MAT01.
3.4 Sources of information	Cameron & Askew (Eds.) (2011) EUSeaMap - Preparatory Action for development and assessment of a European broad-scale seabed habitat map final report. Available at https://emodnet.ec.europa.eu/sites/emodnet.ec.europa.eu/files/public/20110228_finalreport_euseamap_v28.pdf. CMRC (2006-12) *Marine Irish Digital Atlas*. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/. Crowe, T.P., Fitch, J.E., Frid, C.L.J. & Somerfield, P.J. (2011) A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks and Wildlife Service. 99pp. Davies, J., Guinan, J., Howell, K., Stewart, H. & Verling, E. (ed.) (2008) MESH South West Approaches Canyons Survey (MESH Cruise 01-07-01) Final Report. MESH Partnership. 156 pp. DCENR (2003) Coast of Ireland, 2003 Oblique Imagery Survey Viewer, Department of Communications, Energy and Natural Resources, https://www.floodinfo.ie/map/coastal_map/. DCENR (2013) Spatial data for seismic surveys and hydrocarbon wells, Department of Communications, Energy and Natural Resources, http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome. EPA Ireland GeoPortal. https://gis.epa.ie/getdata/download. Guinan, J. & Leahy, Y. (2010) Habitat Mapping of Geogenic Reef Offshore Ireland. Unpublished report to National Parks and Wildlife Service. 193 pp. NPWS. (2011/2). *Conservation Objective Series*. ISSN 2009-4086.

	Huvenne, V.A.I. *et al*. (2009) RRS James Cook Cruise 35, 7-19 Jun 2009. Sidescan sonar mapping of the Whittard Canyon, Celtic Margin. Southampton, UK: National Oceanography Centre, Southampton, 35pp. Long, D., Roberts, J.M. & Gillespie, E.J. (1999) Occurrences of *Lophelia pertusa* on the Atlantic margin. British Geological Survey Technical Report WB/99/24. MERC (2010) Irish Sea Reef Survey. A report to the National Parks and Wildlife Service. 32 pp. Marine Ecological Surveys Limited (MESL) (2017) Reef habitat in Irish Intertidal and near-shore waters. Unpublished report to National Parks and Wildlife Service. Edited by David Alexander, Elena Maher and Vicky West. 90pp. Poulsen, N.E. & Suzyumov, A.E. (2004) North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes: International Conference and Twelfth Post-Cruise Meeting of the Training-Through-Research Programme. 52pp. Forde, J., Alcock, L. & Grehan, A. (2024) Reef habitat in Irish Offshore Waters – A synthesis of current knowledge. *Irish Wildlife Manuals*, No. 152. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. La Bianca, G., Ross, R. & Howell, K. (2018) SEAROVER 2017 Deep Water Reef Habitat & Species Video Analysis. Unpublished report to Marine Institute. La Bianca, G., Ross, R. & Howell, K. (2019) SEAROVER 2018 Deep Water Reef Habitat & Species Video Analysis. Commissioned by Marine Institute, Rinville, Oranmore, Co. Galway. https://data.marine.ie/data/IrelandsSeabedCatalogue/SeaRover%202018/VideoAnalysisReport/Video_Analysis_Report_SeaRover2018.pdf Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The monitoring and assessment of six EU Habitats Directive Annex I marine habitats. *Irish Wildlife Manual*s, No. 118. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. West, V., Maher, E. & Alexander, D. (2024) Reef Habitat in Irish Intertidal and Nearshore Waters. *Irish Wildlife Manuals*, No. 150. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***151,400 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="3"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td colspan="2"></td></tr>
<tr><td>b) Maximum</td><td colspan="2"></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="3">a) 151,400 km²</td></tr>
<tr><td colspan="3">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="3">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="3">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td colspan="2">☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="3">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="3">☐ <u>Other</u></td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="3"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="3">The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of Reefs.</td></tr>
</table>

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2007-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***20,967 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		

5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***1994-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 20,967 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Expert opinion*	
	☐ ***Other***	

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The Favourable Reference Area (FRA) is set as the current area as there is no evidence of a decline since the Directive came into force and this is considered adequate to ensure the long-term viability of the habitat. Short-term and long-term trends were estimated based on best expert judgement. Although the range has increased, the area covered by Reef habitat within the range has decreased for this reporting cycle. This is primarily due to the replacement of older, coarser manually digitised maps of rock in the nearshore (< 200 m) with newer, high-resolution data from the Irish Shelf Seabed Geomorphology Map (v 2023). The newer data uses a robust, automated method to extract rock features from multibeam echosounder bathymetric imagery (5 m) which supersedes the manually delineated features in older maps collated during the last reporting cycle.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***587 km²***
		Maximum	***587 km²***
	b) Area in not-good condition	**Minimum**	***0 km²***
		Maximum	***0 km²***
	c) Area where condition is not known	**Minimum**	***20,380 km²***
		Maximum	***20,380 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2007-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing / uncertain/* ***unknown***		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species has not changed in comparison to previous reporting period. As per the previous reporting cycle report, typical species occurring on intertidal and subtidal reef include the algal species *Ulva* spp., *Chaetomorpha* spp., *Fucus* spp., *Laminaria* spp., *Dictyota dichotoma, Corallina officinalis, Porphyra* spp. *Chondrus crispus, Mastocarpus stellatus, Delesseria sanguinea, Cryptopleura ramosa, Lomentaria articulata, Polysiphonia* spp., and *Ceramium* spp. The typical invertebrate species of near-shore Reef habitat include the invertebrate species of poriferans (*Scypha ciliata, Grantia compressa, Halichondria panicea, Hymeniacidon perleve, Cliona stellata, Pachymatisma johnstonia, Dysidea fragilis*), cnidarians (*Nemertesia antennina, Halecium halecium, Anemonia viridis, Actinia equina, Sagartia elegans, Actinothoe sphyrodeta, Corynactis viridis, Alcyonium digitatum, Caryophyllia smithii, Metridium* spp.), polychaetes (*Sabellaria alveolata, Spirorbis* spp. *Pomatoceros triqueter*), crustaceans (*Balanus* spp., *Semibalanus balanoides, Carcinus maenas, Cancer pagurus, Necora puber, Pagurus bernhardus, Galathea* spp.), molluscans (*Gibbula* spp., *Littorina* spp., *Nucella lapillus, Patella* spp., *Calliostoma zizyphinum, Aplysia punctata, Mytilus edulis*), bryozoans (*Alcyonidium diaphanum*), echinoderms (*Antedon bifida, Echinus esculentus, Marthasterias glacialis, Holothuria forskali, Aslia lefevrei, Pawsonia saxicola*), and tunicates (B*otryllus schlosseri, Ascidia mentula, Dendrodoa grossularia*). A range of fish species are also associated with this habitat including *Pholis gunnellus, Lotidae* spp., *Nerophis lumbriciformis, Pollachius* spp., *Conger conger, Labridae* spp.). Deepwater Reefs exhibit a range of species including scleractinian corals (*Lophelia pertusa, Madrepora oculata, Solenosmilia variabilis*, *Flabellum* spp. *Desmophyllum dianthus*), antipatharian black corals (*Cirrhipathes* sp., *Leiopathes* sp., *Parantipathes* sp., *Stichopathes gravieri*), soft corals (*Anthomastus grandiflorus, Paragorgia arborea, Paramuricea* spp., *Anthothela* spp. and isididaen bamboo corals), sea pens (*Pennatula phosphorea, Kophobelemnon* spp.), anemones (*Bolocera* spp.), sponges (*Aphrocallistes* spp., *Hexactinellid* spp., *Pheronema* spp.), echinoderms (*Brisingella coronata, Pseudarchaster* spp., *Psolus squamatus, Cidaris cidaris, Koehlermetra porrecta*), crustaceans (*Bathynectes* spp., *Chirostylus* spp., *Chaecon* spp., *Neolithoides* spp.) and fish (*Chimaera monstrosa, Lepidion eques, Synaphobranchus* spp., *Neocyttus helgae, Coryphaenoides rupestris).*
6.8 Additional information *Optional*	During the last reporting cycle, 618 km^2 of inshore reef habitat was surveyed to assess Structure and functions (Scally *et al.,* 2020) and the Structure and functions were assessed as *Unfavourable-Inadequate* using expert judgement. This represented 2.8% of the total national habitat resource. Given the findings of these previous surveys, the decreased surface area of Reefs resulting from improved mapping, and that no further surveys of the habitat have been concluded during

	this reporting cycle, it was assessed that 587 km^2 of the habitat is in good condition (i.e. 2.8% of the updated surface area) and 20,380 km^2 is in unknown condition, with an *unknown* short-term trend direction. The reporting from the previous reporting cycle is used to extrapolate the condition of the habitat during this cycle, with the relative proportions maintained. Further elaboration is provided in section 7.4 explaining the relationship between pressures and threats and the assessment of Structure and functions.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PG01 Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional)	Ongoing and likely to be in the future	Majority 50-90%	High
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Majority 50-90%	High

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gerritsen, H.D. (2024) Atlas of Commercial Fisheries around Ireland, fourth edition. Marine Institute, Ireland. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data. The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp. Scally, L., Pfeiffer, N.J. & Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
7.4 Additional information *Optional*	Pressures and threats were selected based on best expert judgement and an analysis of data from various spatial sources related to the pressures observed. Pressures were ranked based on the level of

	importance in ascending order from 1, with 1 being the highest importance. Pressures identified during extensive surveys conducted during the last reporting cycle remain unchanged during this reporting cycle and are further evidenced by additional data sources. A comprehensive analysis of pressures and threats, based on extensive data collection, was conducted during this reporting cycle. In order to assess pressure PG03 'Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional)', a robust methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018 – 2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion). Pressure PG03 was identified as occurring across the majority of the area of the national habitat resource. This high-influence pressure relates to bottom-impacting fishing metiers which result in direct and immediate influence on the habitat's structure and functions. The use of towed and static gear on reef habitats for the capture of fish and crustaceans is common throughout the majority of reef habitat, with areas of high intensity resulting in significant bottom impact in certain areas of reef. Offshore reef is particularly vulnerable to bottom-towed gear which frequently will result in what must be considered as permanent loss to the keystone communities there, given the extremely slow-growing nature of these ecosystems.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* ***c) Long-term response (after 2036)***
8.6 List of main conservation measures	MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats)
8.7 Additional information *Optional*	Regulation (EU) 2016/2336 which proscribes the use of bottom-trawls below 800 m is a positive action in conserving the offshore reef habitat. However, further measures, in addition to previously identified measures, are needed to protect the Structure and functions of Reef habitat. The implementation of the following conservation measure would improve the structure and function of this habitat: MG01 Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats)

	The impact of bottom fishing activities pose a pressure on the Structure and functions of this habitat.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *unknown*. Conservation status of Structure and functions has been assessed as *Unknown*. Although bottom trawling below 800 m has been banned, it will take a significant period of time for impacted reefs to recover. Furthermore, high impact pressures, such as bottom fishing on reefs in waters shallower than 800 m, persist. Future prospects of Structure and functions are therefore *Bad*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / Bad (U2) /* ***Unknown (XX)***
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*

<table>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / deteriorating / <u>stable</u> / unknown</td></tr>
<tr><td rowspan="9">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td>a) No, there is no difference</td><td><u>a) No, there is no difference</u></td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td><u>c) yes, due to improved knowledge/more accurate data</u></td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td><u>d) yes, due to the use of different method</u></td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / <u>improved knowledge or more accurate data</u> / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">Through the comprehensive analysis of pressures and threats conducted during this reporting cycle it has been identified that the use of towed and static gear on reef habitats for the capture of fish and crustaceans is common throughout the majority of reef habitat, with areas of high intensity resulting in significant bottom impact in certain areas of reef. Offshore reef is particularly vulnerable to bottom-towed gear which will result in what must be frequently considered as permanent loss to the keystone communities there, given the extremely slow-growing nature of these ecosystems.

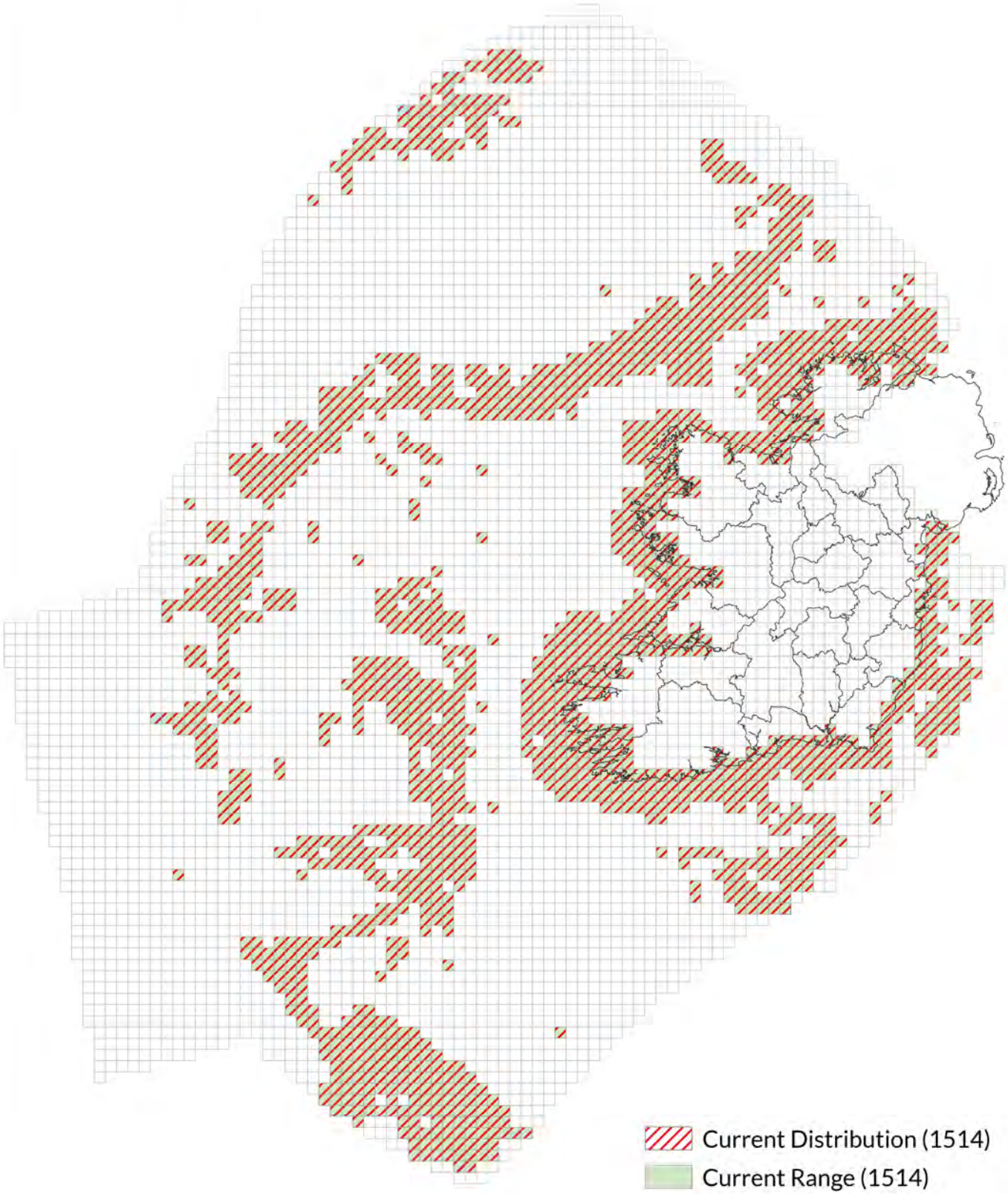
Although Regulation (EU) 2016/2336, which proscribes the use of bottom trawls below 800 m, is a positive action in conserving the offshore reef, it will take a significant period of time for impacted reefs to recover. Furthermore, due to the difficulty in policing the vast area in which this vulnerable habitat occurs, the fact that a single trawling event can result in permanent destruction of the habitat, and that high impact pressures, such as bottom fishing on reefs in waters shallower than 800 m persist, the Future prospects of Reef habitat are assessed as Unfavourable-Bad.</td></tr>
</table>

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***5,334 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The total area of the habitat within the SAC network is 5,334 km². The total area of the habitat that occurs in SACs where Reef is listed as a QI is 4,796 km².	

12 Complementary information *N/A*

Reefs (1170)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 50 100 km

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1180 Submarine structures made by leaking gases**
1.2i Habitat short name	**Submarine structures made by leaking gases**
1.3 Habitat description	This marine habitat feature has been defined by European Commission guidance (2007) as submarine structures consisting of sandstone slabs, pavements, and pillars up to 4 m high, formed by the aggregation of carbonate cement resulting from microbial oxidation of gas emissions, mainly methane. The formations are interspersed with gas vents that intermittently release gas. The methane most likely originates from the microbial decomposition of fossil plant materials. Two sub-types are described in the EC guidance, namely 'bubbling reefs' and carbonate structures within pockmarks (depressions in soft sediment seabed areas, up to 45 m deep and a few hundred metres wide). These formations support a zonation of diverse benthic communities consisting of invertebrate specialists (in deeper water) of hard marine substrates different from that of surrounding habitat. Sheltering fauna within the caves and interstices further contribute to the biodiversity of the habitat. A variety of sublittoral topographic features are included in this habitat such as overhangs, vertical pillars and stratified leaf-life structures with numerous caves. Surveys on this habitat feature noted that, on the large rocks and boulders, dense clusters of the anemone *Mertridium senile* occur. Dense beds of hydroids, including *Nemertesia, Hydrallmania falcata* and *Tubularia indivisa*, are widely recorded, particularly along the edge of features. A wide variety of anemones occur; these include the cerianthid *Cerianthus lloydii* on soft overlying sediment, and among others, *Alcyonium digitatum, Sagartia elegans, Urticina felina*, and *Actinothoe sphyrodeta* on harder ground, principally on pavement areas. In the crevices, overhangs and between rocks, the edible crab *Cancer pagurus* is very abundant, while squat lobsters *Munida* sp. and *Homarus gammarus* lobsters also occur. A variety of sponges, including the boring sponge *Cliona celata* and the lace sponge *Clathrina coriacea* are present, as is the bryozoan *Flustra foliacea*. The feather star *Antedon bifida* is commonly seen in the crevices and under overhangs. The fish species recorded included *Trisopterus luscus* (Bib) and *Chirolophis ascanii* (Yarrell's Blenny). None of these species would typically occur in the surrounding habitat of mobile sand.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2018***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	-

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/**NO***
3.3 Additional information	This habitat was first reported during the last reporting cycle (2013-2018). The data have been collected through extensive seabed surveys to identify gas reserves. The habitat forms from a chemical reaction from the gas leaking into sea water, precipitating carbonate and forming mounds which become colonised by benthic fauna. A biological survey was undertaken to assess the presence of these habitats in the Kish and Codling Fault Zones.
3.4 Sources of information	Croker, P.F., Kozachenko, M. & Wheeler, A.J. (2005) Gas-related seabed structures in the Western Irish Sea (IRL-SEA6). SEA6 Technical Report. Petroleum Affairs Division. European Commission DG Environment (2007) Interpretation Manual of European Union Habitats (Version EUR 27). European Commission DG Environment, Brussels. Leahy, Y. (2013) RV Celtic Explorer CE13_016 Cruise Report. Report 9th February to 12th February, 2013. O'Reilly, S., Szpak, M., Monteys, X. & Kelleher, B.P. (2010). RV Celtic Voyager CV10_28 Cruise. Report 2nd June to 7th June, 2010.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***400 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	

<table>
<tr><td>4.11 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 400 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:

☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other</td></tr>
<tr><td>4.13 Range when Directive came into force

Optional</td><td colspan="2">400 km².

The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of the habitat.</td></tr>
<tr><td>4.14 Additional information

Optional</td><td colspan="2">Range was estimated during the last reporting cycle (2013-2018) based on partial data with some extrapolation and/or modelling.

No further surveys have been conducted since the last reporting cycle. However, there is no evidence of any change to the range of this habitat feature in Ireland.

Favourable Reference Range was considered to be the same as the current range as there is no evidence of decline since the Directive came into force. Due to the physical nature of this habitat, change in range is considered highly unlikely.</td></tr>
</table>

5 Area covered by habitat			
Area covered by the habitat type within the range in the biogeographical/marine region concerned			
5.1 Year or period	***2007-2018***		
5.2 Surface area *(in km²)*	**a) Minimum**		
	b) Maximum		
	c) Best single value	***25 km²***	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*		
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*		
5.6 Short-term trend Period	***2013-2024***		
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*		
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**		
	b) Estimated Maximum		
	c) Pre-defined range		
	d) Unknown	***Short-term trend magnitude is unknown***	
5.9 Short-term trend Magnitude Type of estimate			
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
5.11 Long-term trend Period *Optional*	***1994-2024***		

5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 25 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Expert opinion*	
	☐ ***Other***	
5.16 Surface area when Directive came into force *Optional*	***25 km²***	
5.17 Additional information *Optional*	Favourable Reference Area has been set as the current area as there is no evidence of a decline since the Directive came into force and this area is considered sufficient for long-term viability of the habitat. Short-term and long-term trends were estimated based on best expert judgement. It is considered highly unlikely that the area of this habitat will change significantly due to the physical and geological nature of the habitat.	

	No further surveys have been conducted since the last reporting cycle (2013-2018), however is it unlikely that there have been any changes to the area.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***25 km²***
		Maximum	***25 km²***
	b) Area in not-good condition	**Minimum**	***0 km²***
		Maximum	***0 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	The list of typical species has not changed in comparison to the previous reporting period and includes the following species: *Metridium senile, Nemertesia* sp., *Hydrallmania falcata, Tubularia indivisa, Cerianthus lloydii, Alcyonium digitatum, Sagartia elegans, Urticina felina, Actinothoe sphyrodeta, Cancer pagurus, Munida* sp., *Homarus gammarus, Cliona celata, Clathrina coriacea, Flustra foliacea, Antedon bifida, Trisopterus luscus* and *Chirolophis ascanii*.		
6.8 Additional information *Optional*	-		

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PG03 Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats	Ongoing and likely to be in the future	Whole >90%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gerritsen, H.D. (2024) Atlas of Commercial Fisheries around Ireland, fourth edition. Marine Institute, Ireland. INFOMAR (2024) Bathymetry data. https://www.infomar.ie/data. The N2K Group (2015) European Economic Interest Group Overview of the Potential Interactions and Impacts of Commercial Fishing Methods on Marine Habitats and Species Protected Under the EU. The Habitats Directive. Marine Institute (2013) A Risk Assessment Framework for Fisheries in Natura 2000 Sites in Ireland: with Case Study Assessments. Version 1.3. Galway, 31pp.
7.4 Additional information *Optional*	Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. A comprehensive analysis of pressures and threats, based on extensive data collection, was conducted during this reporting cycle. Particular considerations were made for how pressures were assessed for this habitat due to the scale of the national habitat resource. In order to assess pressure PG03 'Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats', a robust methodology was developed to assess the level of impact from marine fish and shellfish harvesting activities on seafloor habitats. This methodology involved a calculation, utilising data from various sources, to assign a level of impact (i.e. Low, Medium, High or Significant bottom impact, or No impact where the value was zero) to areas where fishing activity overlapped with the habitat resource. This calculation utilised commercial fishing activity VMS data (within the Irish EEZ, in the period 2018-2022), bathymetry, fishing effort, percentage area of fishing, and accounted for the differing levels of impact each fishing métier has on the seabed (based on a combination of published literature, guidance documents and expert opinion).

	The pressure PG03 was found to occur across 100% of the national habitat resource, with medium-impact fishing occurring over 40% of the area and low-impact fishing occurring over 60% of the area.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* ***b) Measures needed but cannot be identified*** *c) Part of measures identified have been taken* *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	
8.3 Main purpose of the measures taken	
8.4 Location of the measures taken	
8.5 Response to the measures	
8.6 List of main conservation measures	None identified
8.7 Additional information *Optional*	The precise nature of the measure needed to address the fishing pressure observed in this cycle has not yet been identified and will be informed by further investigations planned during the next reporting cycle.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor / Bad /* ***Unknown***
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected as the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. The potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term.	

	Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and the physical structure of the habitat. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and Functions is *stable*. Conservation status of Structure and functions is therefore *Favourable*. However, given the pressure identified during this reporting cycle, and that no additional surveys have been conducted during this reporting cycle, Future prospects of Structure and functions are *Unknown*.

10 Conclusions

Assessment of conservation status at end of reporting period

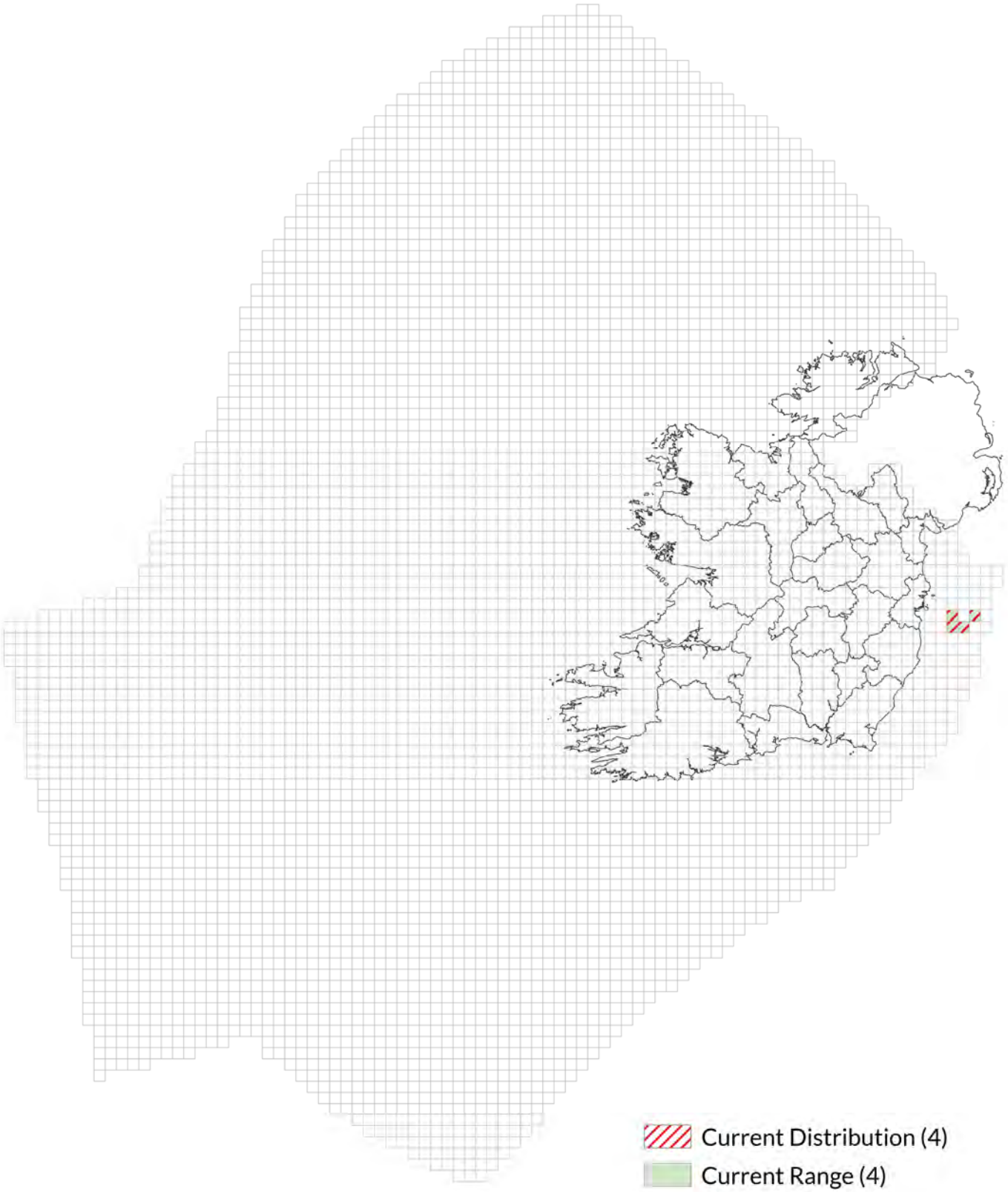
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	-	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***17 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a)*** ***stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The majority of the national resource is contained within the Codling Fault Zone SAC (003015). Surveys undertaken during the last reporting cycle (2013-2018) over the area indicate it was in good condition.	

12 Complementary information *N/A*

Submarine structures made by leaking gases (1180)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 50 100 km

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1210 Annual vegetation of drift lines**
1.2i Habitat short name	**Drift lines**
1.3i Habitat description	1210 Annual vegetation of drift lines occurs on the upper part of the strand around the high tide mark, on sandy, shingle, or gravel substrates. Tidal movements deposit organic matter which provides nutrients and a seed source for vegetation. The vegetation typically comprises annual plants that are tolerant of high salinity, drought, and wind exposure (Delaney *et al*., 2013), such as *Cakile maritime* (Sea Rocket), *Atriplex* spp. (oraches) and *Salsola kali* (Prickly Saltwort) (JNCC, 2004). Due to the harsh environmental conditions, this habitat is typically species-poor, fragmented, and occupies narrow areas. It also exhibits high inter-annual variability, being absent in some years as a result of natural or anthropogenic causes.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1996-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 1210 polygons mapped by the Coastal Habitat Monitoring Surveys (Gallagher *et al.*, in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.), Devaney *et al.* (2014), Delaney *et al.* (2013), NPWS (2012), and Ryle e*t al.* (2009), Ó Riain (2007), Wicklow County Council (2004), and Crawford *et al*. (1996), in addition to point data from Crawford *et al*. (1996), Moore & Wilson (1999), NPWS (2007), Gaynor (2008), Ryle *et al.* (2009), Delaney *et al.* (2013) and the New Atlas of the British and Irish Flora of Preston *et al*. (2002; data post-1987, same data set as used during previous reporting period). All of the datasets listed above that were published prior to 2019 were also used to compile the distribution map for the last reporting period (NPWS, 2019). However, some polygons from these datasets may not

	have been included in determining the current distribution of 1210 in cases where the data have been superseded by a more recent survey. A certainty rating system was applied to each polygon and point that informed the distribution map. The rating system uses a range from 1 to 3, with 3 representing the highest level of certainty and 1 representing the lowest level of certainty. All polygons that were subject to a walkover field survey in 2022/2023 as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 3. Any polygons which were only viewed from a distance in the field, or subject to desktop survey as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 2. Data from Devaney *et* al. (2014) and Delaney *et al.* (2013) were assigned a certainty level of 3 in the previous round of reporting. However, given the age of these data (now 10 years or older), a certainty level of 2 was assigned for the current round of reporting. Data from Ryle *et al*. (2009) and NPWS (2012) were assigned a certainty level of 2 in the last round of reporting. As these data are now nearly 20 years old, a certainty level of 1 was assigned in the current reporting period. Data from Crawford *et al.* and Moore & Wilson (1999) are both over 20 years old and so were assigned a certainty rating of 1 in the current reporting period. Data from Gaynor (2008) and Preston *et al*. (2002) do not have exact dates associated with them and were assigned a certainty level of 1 in the current reporting period. Data from Wicklow County Council (2004) and Ó Riain (2007) were both assigned a certainty level of 2 in the current reporting period as the data are over 10 years old. All points and polygons with a certainty rating of 1 or 2 were individually assessed to confirm their certainty rating. All points and polygons with certainty 1 to 3 were used to map the distribution of the 1210 habitat. It should be noted that the majority of points do not represent actual point locations of 1210 habitat, but indicate that this habitat occurs within the 10 km grid cells where the point occurs. As many of the points and polygons are now more than 20 years old, follow-up surveys should be undertaken to confirm the presence of 1210 habitat at these locations. During the previous reporting period an additional data source which contributed to the creation of the distribution map of 1210 was Martin *et al.* (2017). The data from Martin *et al.* (2017) was superseded by the Coastal Habitat Monitoring Projects data in the current round of reporting, as these sites were revisited and field surveyed in 2022/2023.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Crawford, I., Bleasdale, A. & Conaghan, J. (1996) Biomar Survey of Irish machair. A report to the National Parks and Wildlife Service. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. Devaney, F., Barron, S. & Delaney, A. (2014) Survey of sand dune habitats at Portrane, Co. Dublin. Unpublished report by BEC Consultants Ltd. Gallagher, M.C. & Crushell, P. (in prep.). Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin Gaynor, K. (2008) The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin. Moore, D. & Wilson, F. (1999) National Shingle Beach Survey of Ireland 1999. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2007) Habitat assignment project. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. NPWS (2012) Management Planning Support Unit Maps 2405_imap95. CPU_Habitats_March_2012.shp NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin Ó Riain, G. (2007) Final Report - Survey & Mapping of Habitats in the Carrigaline Electoral Area. Report prepared for Cork County Council, County Cork Heritage Forum, and The Heritage Council. 42 pp. Preston, C.D., Pearman, D.A. & Dines, T.D. (2002) *Atlas of the British and Irish flora*. Oxford University Press, Oxford.

	Rigoni, P., Lupieri, G., Rodi, E. S., Croci, G. & Minguzzi, E., (in prep.). Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Dublin. Wicklow County Council (2004) Coastal shapefile. coastal_ver_1.shp.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***19,200 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***2%***
	b) Estimated Maximum	***2%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) in km²*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	The Favourable Reference Range was increased to 18,800 km^2 in the previous reporting period (NPWS 2019) and to 19,200 km^2 in the current reporting period to reflect improved knowledge. 1210 is a highly mobile, ephemeral habitat that arises and disappears in accordance with natural processes active over short periods. As we continue to monitor coastal sites in accordance with Article 11 of the	

	Habitats Directive, we continue to improve our understanding of the full range within which the habitat naturally occurs. The figure provided here can therefore be considered a minimum value. The Favourable Reference Range is approximately equal to the current range of 1210 (currently 19,200 km^2). There has been no evidence of loss of range since the Directive came into force and the geographic spread is considered sufficient for the long-term survival of the habitat.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 1210 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. A total of seventeen 10x10 km grid cells generated by the range tool that had no coastline or no suitable coastline (i.e. rocky shoreline and cliffs) were removed ((C43, F82, G74, G88, L74, L83, L87, O08, O15, R06, R19, S40, S91, S92, T03, T28, and W97). The current range is four 10x10 km grid cells higher than the range during the previous reporting period (NPWS, 2019). Fluctuations in habitat extent and distribution are expected for 1210 given its dependence upon dynamic processes and on this occasion, these fluctuations have given rise to increased range. The observed change in range is attributed to "f) yes, due to other reasons" to accommodate the role of natural fluctuations as opposed to habitat restoration or recovery. As the increase in range is due to natural factors, the short-term and long-term trends were assessed as being *stable*.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2023***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.57 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">A Favourable Reference Area has not been determined for 1210 but during the previous reporting period (NPWS, 2019), it was reported to be <10% more than the current area at that time (0.55 km^2). It was determined that the Favourable Reference Area would have been greater than the area reported as there had been some losses of 1210 habitat as a result of anthropogenic activities since the Directive came into force. In addition, there had also been some losses due to natural processes.</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The extent and distribution of 1210 are highly dependent on dynamic coastal processes. Because of this natural dynamism, the area of 1210 has increased by 0.02 km^2 in comparison to the previous reporting period (NPWS, 2019). There were no losses in area of 1210 during the current reporting period as a result of anthropogenic activities. The change in area is ascribed to “f) yes, due to other reasons” because it is due to natural fluctuations in this dynamic foredune habitat rather than restoration efforts or habitat recovery. Therefore, the short-term trend is stable.</td></tr>
</table>

	Losses in area due to anthropogenic activities were noted by NPWS (2013) and there is no evidence that there has been restoration of this habitat loss. Therefore, the long-term trend in Area is *decreasing*.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.56 km²***
		Maximum	***0.56 km²***
	b) Area in not-good condition	**Minimum**	***0.01 km²***
		Maximum	***0.01 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	The list of typical species is the same as the last two reporting periods (NPWS 2013; NPWS 2019) and was devised by Delaney *et al*. (2013). The Structure and functions criteria, including typical species, used to assess the 1210 habitat are listed in Appendix I of Delaney *et al*. (2013). Typical species: *Atriplex* spp., *Beta vulgaris* ssp. *maritima, Cakile maritima, Galium aparine, Honckenya peploides, Polygonum oxyspermum, Salsola kali, Tripleurospermum maritimum.*		
6.8 Additional information *Optional*	During the current reporting period, the Structure and functions of 1210 were assessed at 23 sites using field survey data. Four additional sites were surveyed and had 1210 habitat present, but the area of		

	1210 was below the minimum size threshold required to carry out an assessment of the Structure and functions. During the previous reporting period (NPWS, 2019), data were only available to assess the Structure and functions of 1210 at four sites. As the Structure and functions were assessed as being in *Favourable* condition at all four sites, 100% of the habitat was determined to be in good condition. Although this was a relatively small sample size, the outcome was very similar to that of NPWS (2013) who reported that 95% of the habitat was in good condition. Based on expert judgement, the value of 95% was used in NPWS (2019) as it was considered to be more accurate than 100%. The 23 sites where Structure and functions were assessed during the current reporting period represent 25% of the current area of 1210 nationally. This is deemed to be a good sample size with a good geographic spread and is assumed to be a representative sample of the habitat nationally. It was found that 98% of the habitat was in good condition. The approach used to estimate the percentage of 1210 habitat in good condition at each site was as follows: If none of the Structure and functions assessment criteria failed at the site level and there was an absence of any impacting activities resulting in areas in not-good condition, 100% of the area was classified as being in good condition. In the instance where one or more of the Structure and functions criteria failed the assessment, the area of habitat where measures would need to be taken for those assessment criteria to pass was assigned as the area in not-good condition. This represents a change in methodology compared to the previous reporting period (NPWS, 2019), where the failure of one criterion resulted in 25% of the area being considered to be in not-good condition, and the failure of two or more criteria resulted in between 25-100% of the area being considered in not-good condition. During the current reporting period, the most frequent criterion to fail the assessment was 'positive indicator species' (two sites). In addition, 'damage due to disturbance' and 'interference with sediment dynamics' each failed the assessment at a single site. 'Damage due to disturbance' and 'interference with sediment dynamics' were also the most frequent criteria to fail during the reporting period before last (NPWS, 2013). None of the criteria failed the assessment in the previous round of reporting (NPWS 2019); however, only a very small number of sites were included in that assessment. As the percentage of habitat in good condition is very similar to the previous reporting period, the short-term trend is *stable*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PM01 Storm or cyclone	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	In the past but now suspended due to measures		

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Data relating to pressures and threats were collected during field surveys carried out for the Coastal Habitat Monitoring Surveys in the current reporting period (Gallagher *et al.*, in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.). Data relating to pressures were recorded at individual sites, then collated and interpreted at a national level. At the site level the following information was collected regarding pressures: impact, influence, occurrence, timing, trend, and area impacted. These data were collated and interpreted assigning values for timing, scope and influence at a national scale. At the national level, timing was recorded for each pressure under one of three categories: 'Past/suspended', 'Ongoing', and 'Ongoing/future'. When determining timing at the national level, the most current option was selected. For example, if a pressure was recorded as 'Past/suspended' at one or more sites, but was also recorded as Ongoing/future at one or

	more sites, then 'Ongoing/future' was selected as the timing at the national level. When determining scope, the total area recorded as being impacted by the pressure at individual sites was totalled and expressed as a percentage of the total area of the habitat nationally. Typically this resulted in values within the 'Minority <50%' category. To determine the influence of the pressure at a national level, the influence at individual sites was considered in addition to the level of impact of the pressure (neutral / negative), and the area impacted at the site level in order to determine an average value not only amongst the sites surveyed, but at a national level. Where multiple values for influence were selected across sites, a best attempt at selecting a representative average value was made. For instance, if a pressure was recorded as having a high neutral impact at one site but a medium negative impact at a second site a 'Medium' influence was assigned to the pressure at the national level. If a pressure was only recorded at a single site, having a high neutral impact over a very small area, then this was assigned as having a 'Low' influence at the national level. All recorded pressures were collated and ranked; however, only those pressures that are clearly linked to area loss or failures in the Structure and functions of the habitat are seen as being of highest importance, as addressing those pressures should contribute to an improvement in the overall conservation status of the habitat. A total of 22 pressures were recorded across 18 sites. Pressures and threats recorded during the current reporting period are listed in section 7.1. The most frequently recorded pressure was PF05 (10 sites) typically as a result of walking and trampling, though it was generally classified as a low-impact pressure at the sites where it was recorded. PF15 was recorded at 15 sites, generally as a result of the presence of rock armour or other coastal defences. In many cases these structures have been in place without modification since before the Directive came into force and so are viewed as having a neutral impact. These two pressures were also the only two pressures associated with failure of Structure and functions assessment criteria and so are seen as the most significant pressures for 1210 at a national level. While the remaining pressures (PA25, PF03, PM01 and PM07) were recorded within 1210 habitat at one or more sites nationally, they are not currently impacting the conservation assessment of the habitat. Mechanical beach cleaning, which was noted in previous assessments, occurs at a minority of beaches in Ireland during the busiest summer period and was not noted among the sample sites surveyed. This is likely to be due to the timing of surveys rather than cessation of the practice.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* ***a) Measures identified, but none yet taken*** *b) Measures needed but cannot be identified* *c) Part of measures identified have been taken* *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	
8.3 Main purpose of the measures taken	
8.4 Location of the measures taken	
8.5 Response to the measures	
8.6 List of main conservation measures	MJ01 Implement climate change mitigation measures (required but not currently being implemented) MF03 Reduce the impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	The vast majority of sites do not require conservation measures, as any pressures or threats are having a low-level impact and are not currently impacting the Structure and functions assessments. MJ01 'Implement climate change mitigation measures' was recorded as required, but not currently being implemented, at one site surveyed during the current reporting period. The fact that MJ01 is not currently being implemented is not impacting the current conservation assessment of the habitat but may do so in the future if the measure remains unimplemented. MF03 'Reduce the impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)' has not been observed within the 1210 habitat, but some sites would benefit from reduced trampling.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. The current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. The future trend of Range is assessed as *stable*, as no change in range is expected based on an assessment of the pressures and threats. Future prospects of Range are therefore *Good*.	

	Area loss was recorded in NPWS (2013) and there has been no evidence of habitat restoration since that time. The current area remains below the Favourable Reference Area and so the conservation status of Area is *Unfavourable-Inadequate*. The future trend of Area is assessed as *stable*, as there was no recorded loss of 1210 habitat due to anthropogenic activities in the current reporting period, and there is no evidence to suggest that there will be losses in the future. Future prospects of Area are therefore *Poor*. The current Structure and functions are assessed as *Favourable* as >90% of the habitat is in good condition. This was also the case during the previous two reporting periods. The short-term trend of Structure and functions in good condition is *stable*. Conservation status of Structure and functions is *Favourable*. The future trend of Structure and functions is assessed as *stable.* Future prospects of Structure and functions are therefore *Good*.

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*

	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range and Structure and functions are *Favourable*, while Area and Future prospects are *Unfavourable-Inadequate*. This is the same as the previous reporting period (NPWS, 2019). The Overall Conservation Status was assessed as *Unfavourable-Inadequate*, which is unchanged from the previous two reporting periods (NPWS, 2013, 2019). The assessment of *Unfavourable-Inadequate* is due to area loss that was previously reported (NPWS, 2013), the fact that this loss has not been restored, and that area remains below the Favourable Reference Area. The trend for the Overall Conservation Status is *stable*. This represents a change from the previous reporting period, where trend was *deteriorating* (NPWS, 2019). The previous trend was due to previous loss of habitat due to anthropogenic activity. As the trend in the current reporting period is related to the trends in Range, Area, and Structure and functions in this reporting period (2019-2024), the current trend is *stable*.	

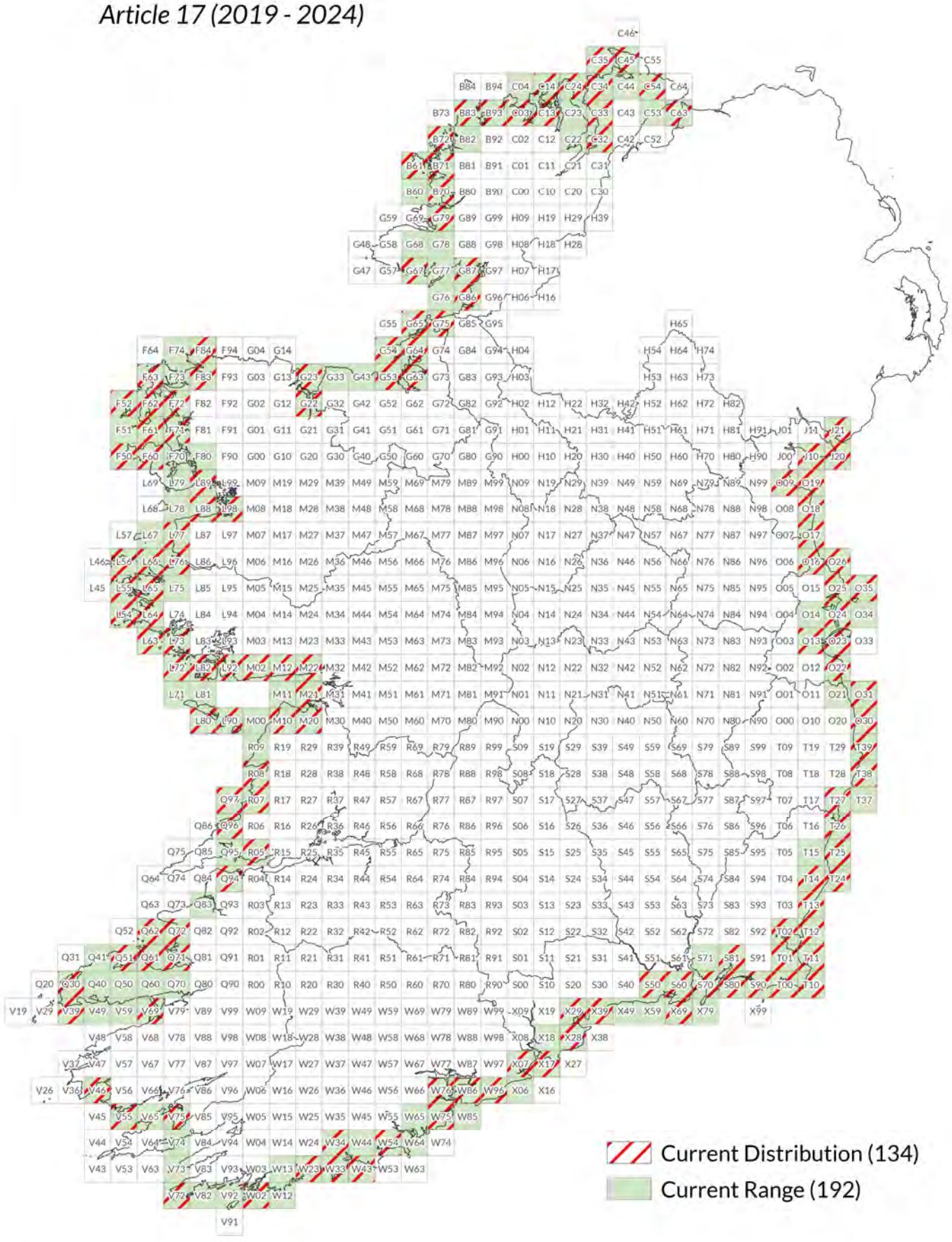
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.38 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefiles. The area provided in section 11.1 is the total area of 1210 habitat in SACs in the country, including some SACs where 1210 is not listed as a Qualifying Interest (QI). The area of 1210 within the Natura 2000 network where it is listed as a QI is 0.38 km^2. There has been a change in the area of 1210 reported within the SAC network since the previous reporting period (NPWS, 2019), which is due to natural fluctuations in this dynamic habitat. There was no loss of 1210 due to anthropogenic activity within the SAC network during the current reporting period or the previous reporting period. Therefore, the short-term trend of area within the SAC network is *stable*. The short-term trend for habitat area in good condition within the SAC network is determined to be *stable*, which is the same trend as for 1210 habitat nationally (see sections 6.4 and 6.8), as the majority of 1210 habitat surveyed during the last two reporting periods occurred within the SAC network.

12 Complementary information *N/A*

Drift lines (1210)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1220 Perennial vegetation of stony banks**
1.2i Habitat short name	**Vegetated shingle**
1.3i Habitat description	1220 Perennial vegetation of stony banks occurs along the coast where shingle (cobbles, pebbles, and gravel ≥2 mm wide) has accumulated to form elevated ridges or banks above the high tide mark. On the upper beach the pioneer community of this vegetation type can be characterised by perennial species such as *Beta vulgaris* subsp*. maritima, Crambe maritima, Crithmum maritimum, Glaucium flavum, Raphanus raphanistrum* subsp. *maritimus, Silene uniflora,* and *Tripleurospermum maritimum*. The majority of the area within this pioneer community is usually bare shingle. At the top of the beach, and moving inland, a wider range of vegetation types can be found at larger shingle sites including a lichen-rich community and coastal forms of grassland, heath and scrub. The grassland community can be characterised by grass species such as *Agrostis capillaris, Agrostis stolonifera, Arrhenatherum elatius, Dactylis glomerata, Poa humilis, Elytrigia repens, Festuca rubra, Holcus lanatus,* and broadleaf herbs such as *Achillea millefolium, Armeria maritima, Cerastium fontanum, Daucus carota, Leontodon autumnalis, Lotus corniculatus, Plantago coronopus, Plantago lanceolata, Potentilla anserina, Taraxacum officinale* agg*., Galium verum,* and *Trifolium repens.* The scrub community can be characterised by the woody species *Lonicera periclymenum, Prunus spinosa, Rubus fruticosus* agg., *Ulex europaeus* and the climber *Calystegia sepium*. These more inland communities have less bare shingle and vegetative cover usually dominates. The majority of the grassland and scrub communities are rooted within soil, whereas the pioneer community is usually rooted in gravel, sand or organic matter (e.g., decomposing seaweed and other plant material).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1995-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The range and distribution 10 km maps were compiled mainly using polygons mapped as containing 1220 habitat by four separate coastal habitat surveys conducted between 2021 and 2023 (Gallagher *et al*., in prep.; Rigoni *et al*., in prep.; NPWS, in prep.). These polygons overlap, and therefore supersede, many of those mapped by surveys that took place in previous reporting periods. However, some polygons from Devaney *et al.* (2014), Delaney *et al.* (2013) and Ryle *et al.* (2009) remain in the dataset as the areas were not revisited. Point data were also used in the construction of the 10 km maps. These points were from Martin *et al*. (2017), Delaney *et al*. (2013), NPWS (2007), Ryle *et al*. (2009), Moore & Wilson (1999), and points supplied by the NPWS coastal expert Dr Karen Gaynor in 2012. All references and sources are detailed in section 3.4. Data sources listed in section 3.4 that recorded the 1220 habitat were assigned a level of certainty; 3 = high certainty, based on a field survey/ground-truthed, 2 = medium certainty, usually based on brief field observations, 1 = low certainty, often data that have not been validated in the field (e.g., based principally on remote imagery). In addition, the age of the data was also taken into consideration, with ground-truthed data that had not been rechecked for over 10 years generally assigned a certainty of 2 and if the data had not been rechecked for over 20 years it was assigned a certainty of 1. All data sources with a certainty of 1 to 3 were used to map the distribution of the 1220 habitat. Following a comparison with the distribution from the previous reporting round (NPWS, 2019), one 10x10 km grid square (G65) has been added to the distribution during the current reporting period and one 10x10 km grid square has been removed (J00) as the 1220 habitat was no longer recorded within it. These changes have resulted in the distribution remaining stable at 117 10x10 km grid cells. These two changes in distribution were due to natural processes.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. EPA, Wexford.

Devaney, F., Barron, S. & Delaney, A. (2014) Survey of sand dune habitats at Portrane, Co. Dublin. Unpublished report by BEC Consultants Ltd., Dublin.

EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford.

Foss, P.J., Crushell, P., O'Loughlin, B. & Wilson, F. (2012) Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council, Kilkenny.

Gallagher, M.C. & Crushell, P. (in prep.). Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

JNCC (2004) Common Standards Monitoring Guidance for Vegetated Coastal Shingle Habitats. Joint Nature Conservation Council, Peterborough, UK.

Martin, J.R. (2018) Backing document for assessment of pressures and threats SDMN17_AR1719_pressures_assessment. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Martin, J.R., Daly, O.H. & Devaney F.M. (2017) Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites. Volume 1: Main report. *Irish Wildlife Manuals,* No. 98. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

Moore, D. & Wilson, F. (1999) National Shingle Beach Survey of Ireland 1999. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

NPWS (2007) Habitat assignment project. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Rigoni, P., Lupieri, G., Rodi, E. S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland.

	Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Dublin. Scott, G.A.M. (1963) The ecology of shingle beach plants. *Journal of Ecology,* 51, 517-527.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***17,300 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* d) yes, due to the use of different method *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 17,300 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 1220 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Following a similar procedure to the one carried out in 2019, fifteen 10x10 km grid cells generated by the range tool that had no suitable coastline (e.g. cliffs were considered unsuitable) were removed. The 15 squares removed were C43, G76/78/88, L75/87, O8/15/20, Q82, R19, S40, V63/77/78. The resulting range is 17,300 km² (range tool output of 18,800 km² minus 1,500 km² for the 15 removed 10x10 km grid cells). A similar methodology was applied in the previous reporting period (NPWS, 2019), with thirteen 10x10 km grid cells removed due to no coastline or suitable habitat.</td></tr>
</table>

	Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Although some areas of 1220 habitat were lost due to anthropogenic impacts, none of these losses led to a decrease in the range. The short-term trend is therefore assessed as *stable* as it was during the last reporting period (NPWS, 2019). Where the habitat was lost from 10x10 km grid cell J00, this appears to be due to natural processes, with saltmarsh replacing the 1220 area. It should be noted that natural coastal processes such as erosion and deposition can result in natural fluctuations in the distribution and range for coastal habitats such as 1220. Our knowledge of where this habitat can occur around the Irish coast is likely to develop each time we carry out a survey, and so the range figure can be considered a minimum value. The Favourable Reference Range (FRR) is retained as 17,300 km², the same as the last reporting period (NPWS, 2019). The current range is the same as the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1995-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.22 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	

	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.30%***
	b) Estimated Maximum	***0.30%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 1995 (Foss et al., 2012), followed by data from 1999 during which the first national baseline survey for 1220 was conducted (Moore & Wilson, 1999) and incorporates updates made by surveys carried out between 2006 and 2023, the details of which are listed in section 3.4; NPWS (2007), Ryle et al. (2009), Delaney et al. (2013), Devaney et al. (2014), Martin et al. (2017), Rigoni et al. (in prep.), Gallagher et al. (in prep.) and NPWS (in prep.).

Favourable Reference Area (FRA) was not determined exactly by NPWS (2019), but was estimated to be approximately equal to the reported extant area. The same approach is followed for the current reporting period, with the FRA deemed to be approximately equal to the current area, given that some anthropogenic losses have occurred since the Directive came into force and acknowledging that there have also been losses due to natural processes.

The mapped area of 1220 habitat covers 1.22 km^2, a decrease of 7 ha from the figure reported in NPWS (2019).

During the current reporting period, 53 sites containing the 1220 habitat were visited and assessed for Area. These 53 sites cover 0.99 km^2 of 1220 habitat and make up 81.1% of the total area of 1220 habitat recorded in Ireland. This represents a significant proportion of the total area of 1220, covering all coasts, and therefore it is</td></tr>
</table>

	considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Short-term trend in Area was deemed to be *decreasing*, which is a change from the *stable* trend that was reported in NPWS (2019). Anthropogenic losses were recorded at five sites during the current reporting period. The losses were due to human modification of the coastline (e.g. rock armour and parking areas), shingle extraction, invasive species, and problematic native species. Loss also occurred due to natural processes such as erosion and deposition, with some areas of 1220 developing into saltmarsh. These changes were not deemed to be anthropogenic in origin, although the root cause of these processes is not always easy to determine and could conceivably be caused by human-induced impacts such as sea level changes as a consequence of climate change. Since the last reporting period, 0.36 ha of 1220 habitat have been lost due to anthropogenic losses such as human modification of the coastline. This represents a 0.30% loss in the national area at a rate of -0.05% per annum (on average the 0.30% loss occurred over 6 years). The long-term trend in Area was also deemed to be *decreasing*, which is the same as the last reporting period (NPWS, 2019).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.97 km²***
		Maximum	***0.97 km²***
	b) Area in not-good condition	**Minimum**	***0.25 km²***
		Maximum	***0.25 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as that utilised during the last reporting period (NPWS, 2019). Where sites surveyed in 2021-23 were previously surveyed, where possible, plots were repeated in the same locations. New plot locations were chosen where it was not possible to repeat an existing plot and at sites not previously surveyed. Plots measured 2 m x 2 m and all species within the plots were recorded. The species listed below were assessed as part of the site assessment criteria. For further details, see Martin *et al*. (2017) and Rigoni *et al*. (in prep.), Gallagher *et al*. (in prep.) and NPWS, (in prep.). The typical species used in assessing the 1220 habitat vary depending on if you are within the pioneer, grassland or scrub community. The typical plant species list for the pioneer community is: *Beta vulgaris* subsp. *maritima, Crambe maritima, Crithmum maritimum, Galium aparine, Glaucium flavum, Lathyrus japonicus, Raphanus raphanistrum* subsp*. maritimus, Rumex crispus, Silene uniflora, Sonchus arvensis* and *Tripleurospermum maritimum.* The typical plant species list for the grassland community is: *Achillea millefolium, Agrostis capillaris, Agrostis stolonifera, Armeria maritima, Arrhenatherum elatius, Cerastium fontanum, Dactylis glomerata, Daucus carota, Elytrigia repens, Festuca rubra, Galium verum, Holcus lanatus, Koeleria macrantha, Leontodon autumnalis, Lotus corniculatus, Luzula campestris, Plantago coronopus, Plantago lanceolata, Poa humilis, Potentilla anserina, Rumex acetosa, Taraxacum officinale* agg., *Trifolium pratense* and *Trifolium repens.* The typical plant species list for the scrub community is: *Calystegia sepium, Lonicera periclymenum, Prunus spinosa, Rubus fruticosus* agg. and *Ulex europaeus.*
6.8 Additional information *Optional*	During the current reporting period, 0.82 km^2 of 1220, distributed across 22 sites and 42 subsites, were assessed for Structure and functions. The assessed area represents 67.0% of the total area of 1220 habitat recorded in Ireland. This is a significant proportion, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Of the total area assessed for Structure and functions during this reporting period, 79.5% (0.65 km^2) of the area was assessed as *Favourable* and 20.5% (0.17 km^2) was assessed as *Unfavourable*. Given that the assessed area represents a significant proportion of the 1220 recorded in Ireland, these percentages can be applied to the total area of the habitat to give 0.97 km^2 in good condition, and 0.25 km^2 not in good condition. The fact that ≥75% but ≤90% of the habitat is in good

	condition equates to an assessment of *Unfavourable-Inadequate* for Structure and functions. The approach used to estimate the percentage of the 1220 habitat in *Unfavourable* condition at each subsite is as follows: If none of the assessment criteria failed at the site level then none of the 1220 area was classified as *Unfavourable* and the whole area of 1220 at the site was assigned as being in good condition; if 1 to 2 criteria failed at the site level this resulted in 25% of the 1220 area being classified as having *Unfavourable* Structure and functions. During the current reporting period, as was the case in NPWS (2019), there were no 1220 sites where more than two assessment criteria failed. Following NPWS (2019), significant negative impacts on Structure and functions, such as coastal protection structures, were taken into consideration when calculating the final percent of 1220 habitat at each site in good condition. The two most frequent assessment criteria to fail were 'Interference with the sediment dynamics' and 'Damage due to disturbance', which failed at 26.2% and 14.3% of assessed subsites overall. This is similar to 2019 when 'Interference with the sediment dynamics' and 'Negative indicator species', and 2013 when 'Interference with the sediment dynamics' and 'Damage due to disturbance' were recorded as the most frequently failing criteria (NPWS, 2019). 'Negative indicator species' was the third most frequent assessment criterion to fail during the current reporting period. During the last two reporting periods, 82% (2019) and 93% (2013) of the 1220 habitat was assessed as *Favourable* (NPWS, 2019). As the percentage of 1220 habitat assessed as *Favourable* in the current reporting period (79.5%) is very similar to the NPWS (2019) figure and allowing for different surveyors and a slightly smaller survey area of 0.65 km^2 in 2019, the short-term trend of habitat area in good condition is assessed as *stable*, as it was during the last recording period.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	High
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	High
PA23 Physical alteration of water bodies (including dams, channels, etc.)	Ongoing and likely to be in the future	Minority <50%	High
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	High
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	High
PF04 Development and maintenance of beach areas for tourism and recreation	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
PK05 Mixed source soil pollution and solid waste (excluding discharges)	Ongoing and likely to be in the future	Minority <50%	Low
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	High
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	High

e) Invasive alien species of Union concern	R06923 *Gunnera tinctoria*
f) Other invasive alien species *Optional*	R03087 *Centranthus ruber* R04400 *Crocosmia crocosmiiflora* R18921 *Elaeagnus rhamnoides* (=*Hipphophae rhamnoides*) R18201 *Reynoutria japonica* R13131 *Rosa rugosa* R17227 *Spartina anglica*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E. S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats listed in section 7.1 were selected and ranked based on a combination of frequency, intensity (high, medium or low), and area of impact, using the data gathered during the 2021-23 coastal surveys (see 7.3 for sources). All pressures and threats reported in 2019 (NPWS, 2019) have also been reported during the current survey, with seven additional pressures and threats reported during the current survey

	based on the 2021-23 coastal surveys. They are listed in 7.1 on the basis of area affected. During the current reporting period, 0.82 km^2 of 1220, distributed across 22 sites and 42 subsites, were assessed and negative pressures were recorded impacting 0.36 km^2 (43.9%) of the survey area. The most significant pressure reported during the current reporting period is PF05 'Sports, tourism and leisure activities'. This often relates to recreational walking/trampling and was recorded at 22 of the surveyed subsites during the current reporting period. This is listed as the top pressure as it affects large areas (12% of the 0.82 km^2 surveyed), and its influence was deemed by surveyors to be high in the majority of cases. PF15 'Modification of coastline, estuary and coastal conditions for built-up areas' usually took the form of coastal protection features such as rock armour. The impact was recorded at 12 of the surveyed subsites and 10% of the 0.82 km^2 survey area as a negative pressure. PF15 was also recorded at 12 subsites as a neutral pressure, usually because the coastal defences were in place prior to the EU Habitats Directive. PA23 'Physical alteration of water bodies (including dams, channels, etc.)' was only recorded at one site but impacts 8% of the 0.82 km^2 survey area. At this one site, engineering works completed during the 1990s to install a permanent drain from Tacumshin Lake impacts sediment flow and previously affected the habitat distribution as 1220 occurs either side of the outlet. Ongoing maintenance is required for these drains and the tracks associated with this infrastructure are regularly used. This activity will continue in the future as sediment regularly blocks the outlet during storm events. PI03 'Problematic native species' was recorded as negatively impacting five sites and 3% of the survey area. The negative species include *Urtica dioica* and *Cirsium arvense,* which are associated with higher nutrient levels and/or more intensive agricultural practices. PK05 'Mixed source soil pollution and solid waste (excluding discharges)' was recorded as marine litter, such as old fishing nets, negatively impacting nine sites but <1% of the survey area. PF06 'Deposition and treatment of waste/rubbish from built-up areas' was recorded negatively impacting nine sites but <1% of the survey area. This relates to litter and the dumping of garden waste. PI02 'Other invasive alien species (other than species of Union concern)' was recorded for the six alien plant species listed in section 7.1f negatively impacting eight sites but <1% of the survey area. *Crocosmia crocosmiiflora* is the most frequently occurring alien invasive species within the 1220 habitat. The other six pressures listed in section 7.1 that were recorded during the current reporting period were each recorded at fewer than five sites and less than 5% of the survey area. PA08 'Extensive grazing or undergrazing by livestock' was recorded due to impacts from cattle grazing such as poaching on grassland shingle. PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)' was related to shingle extraction. PE01 'Roads, paths, railroads and related infrastructure' was noted for a road and one railway line that were recorded within the 1220 habitat. PF01 'Conversion from other land uses to built-up areas' related to the impact

	from a house and associated infrastructure such as a sea wall. PF04 'Development and maintenance of beach areas for tourism and recreation' was recorded for litter. PI01 'Invasive alien species of Union concern' was recorded at one site where *Gunnera tinctoria* is invading an area of 1220. As in NPWS (2019), climate change has not been added as an impact of medium or high importance for the 1220 habitat, but it is likely to affect its range over the coming decades. The long-term trend will see an increase in mean sea level and extreme weather events (Desmond *et al*., 2017), which will impact the formation and stabilisation of the vegetation communities that form the 1220 habitat. In particular, climate change may have unknown impacts on invasive species such as *Centranthus ruber* and it could contribute to the spread of these species in the 1220 habitat.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features
8.7 Additional information *Optional*	MA03 **'**Maintain existing extensive agricultural practices and agricultural landscape features' is particularly important for maintaining the Area and Structure and functions parameters for the grassland 1220 habitat type. MA03 is currently implemented through agri-environment schemes such as the Agri-Climate Rural Environment Scheme (ACRES). *Additional measures not currently active but recommended:* MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats); MI03 Management, control or eradication of other invasive alien species. These measures are recommended, mostly to improve the Structure and functions of the habitat, but they are not yet being implemented within the 1220 habitat. MF03 should be considered for sites where trampling/walking for recreation has been noted as a pressure. Action could include erecting signs to inform the public and temporary fencing during the summer to keep the public out of certain areas. MI03 should be considered for species such as *Centranthus ruber, Crocosmia crocosmiiflora*, *Elaeagnus rhamnoides* (R18921), *Reynoutria japonica, Rosa rugosa*, and *Spartina anglica*, that have all been recorded within the 1220 habitat within the current reporting period. As noted in NPWS (2019), from a long-term standpoint, MJ02 Implement climate change adaptation measures is likely to be required to address the issue of climate change.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	**Good** / *Poor* / *Bad* / *Unknown*
	b) Area	*Good* / ***Poor*** / *Bad* / *Unknown*
	c) Structure and functions	*Good* / ***Poor*** / *Bad* / *Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable***.** Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable***.** Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good***.** Short-term trend direction of Area is assessed as *decreasing*, with a loss of -0.30% of the total surveyed area recorded during the current reporting period. Current area is <2% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative*, as insufficient conservation measures have been identified to counteract the listed pressures, such as the impacts of walking and trampling and the expansion of invasive species into the 1220 habitat, and increase the habitat area to the FRA. Future prospects of Area are therefore *Poor*. The percentage of 1220 habitat in good condition is 79.5% and <90% of the habitat in good condition corresponds to an *Unfavourable-Inadequate* assessment. The current Structure and functions is approximately equal to the last reporting period and the short-term trend direction of Structure and functions is therefore *stable* for habitat that is in good condition. Future trend of Structure and functions is assessed as *negative*, as insufficient conservation measures have been identified to counteract the listed pressures, such as the impacts of walking and trampling and the expansion of invasive species into the 1220 habitat. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** / *Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

<table>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td><u>b) yes, due to genuine change</u></td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td><u>c) yes, due to improved knowledge/more accurate data</u></td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is Favourable in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area, Structure and functions, and Future prospects are Unfavourable-Inadequate, as they were in the previous reporting period.

The Overall assessment of Conservation Status is Unfavourable-Inadequate. This is the same as the previous reporting period. The status of Unfavourable-Inadequate is due to the current area being lower than the Favourable Reference Area, 20.5% of the 1220 habitat not being in good condition, and anthropogenic losses of 1220 as outlined in section 5.17.

Trend in Overall Conservation Status has been assessed as deteriorating due to a decreasing area, with anthropogenic losses of -0.30% of the total surveyed area recorded during the current reporting period. This contrasts with the results for the previous reporting period (NPWS, 2019) in which the overall trend was reported as stable with no anthropogenic losses reported.</td></tr>
</table>

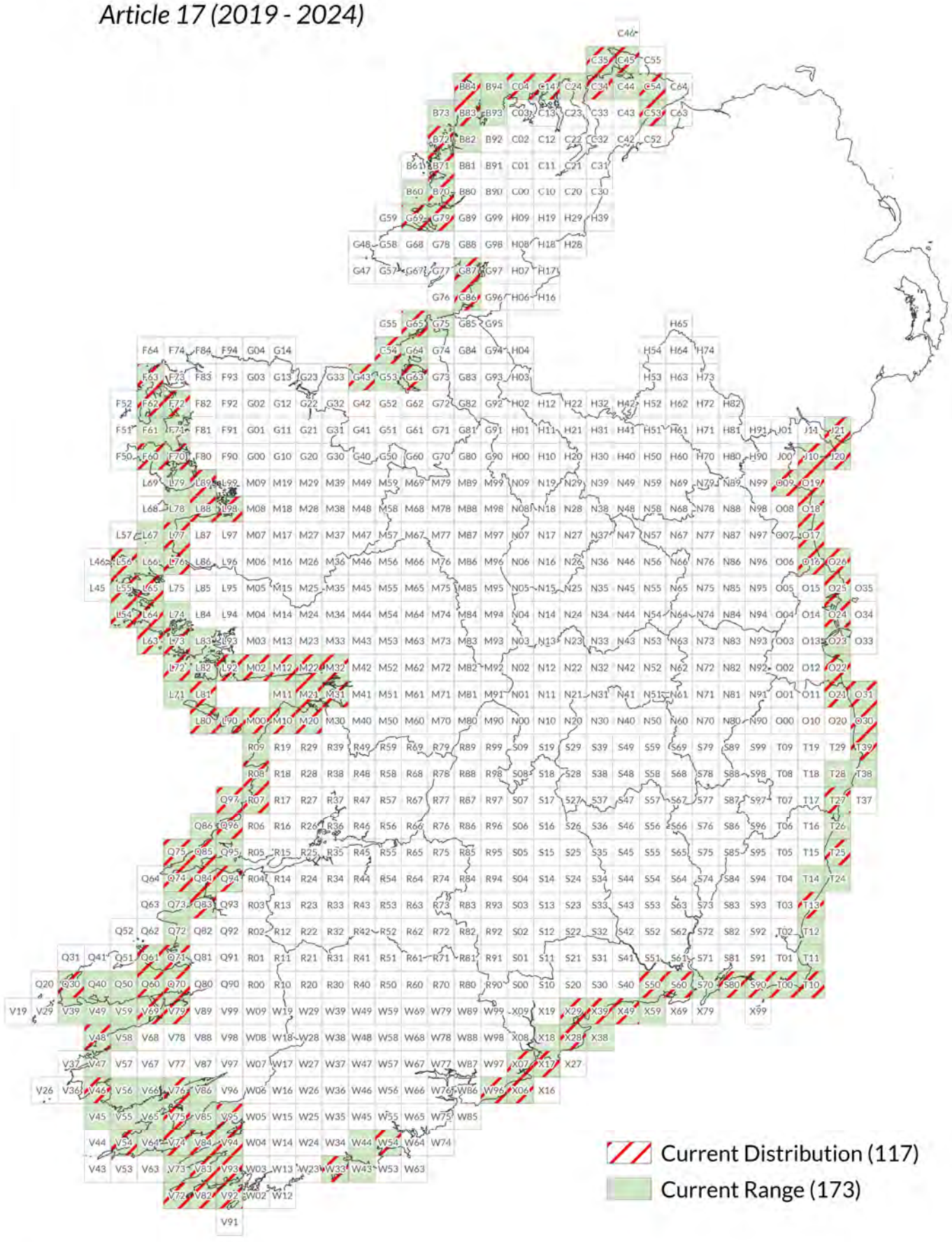
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.98 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network was estimated by performing a union between the distribution polygon shapefile and the SAC shapefile and an intersect between the distribution point shapefile and the SAC shapefile. The area given in section 11.1 is the total area of 1220 habitat within SACs in the country, including some SACs where 1220 is not listed as a qualifying interest (QI).	

	The area of 1220 within the Natura 2000 network where it is listed as a QI is 0.87 km^2. The area of 1220 habitat lost from SACs due to anthropogenic factors is 0.15 ha. There was 1220 area loss from three SACs where the 1220 habitat is a QI, the SACs are Inishmore Island SAC (000213), Buckroney-Brittas Dunes and Fen SAC (000729), and Gweedore Bay and Islands SAC (001141). Due to the pioneer nature of some of the vegetation communities that make up the 1220 habitat, the habitat can be ephemeral and its presence can vary over a short timeframe as natural processes operate to create and destroy the conditions required for its presence. In the absence of evidence of anthropogenic activities leading to the loss, its absence from a site during any given survey is not always of high concern. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 1220 habitat nationally (see section 6.4 and 6.8). Almost all of the 1220 habitat surveyed during the last two reporting periods was within the SAC network. The surface area of 1220 habitat within the Natura 2000 network has decreased slightly from the previous reporting period, this is in part due to genuine change, such as losses due to invasive species, problematic native species and the extraction of shingle for building material, and partly due to natural processes.

12 Complementary information *N/A*

Vegetated shingle (1220)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1230 Vegetated sea cliffs of the Atlantic and Baltic Coasts**
1.2i Habitat short name	**Vegetated sea cliffs**
1.3i Habitat description	All sea cliffs on the Irish coast can be considered to correspond to the EU Annex I habitat Vegetated sea cliffs of the Atlantic and Baltic coasts (1230). A sea cliff is a steep or vertical slope located on the coast, the base of which is in either the intertidal (littoral) or subtidal (sublittoral) zone. The cliff may be composed of hard rock, such as basalt, or of softer substrates, such as shale or boulder clay. Hard cliffs are generally considered to be those ≥5 m high, and soft cliffs ≥3 m high (MERC/EirEco, 2010). The habitat is estimated to occupy approximately 20% of Ireland's coastline, with primary distribution along the southern, western and north-western seaboards (NPWS, 2019). The cliff top is typically defined by a noticeable reduction in gradient, with the slope below shaped by coastal erosion and the area above often formed by inland geomorphic processes. Both zones are influenced by salt spray and wind exposure. The cliff base may show abrupt changes in gradient and can contain features such as boulders, scree, wave-cut platforms, or accumulations of sand. Vegetation on sea cliffs reflects harsh environmental conditions, with communities often composed of salt-tolerant species adapted to wind exposure, drought, and poor soils. Under the Irish Vegetation Classification (IVC), sea cliff vegetation corresponds most frequently with group MC – Maritime Cliff and Rock Vegetation. Common types recorded on Irish sea cliffs include MC1 *Crithmum maritimum-Armeria maritima* maritime crevice vegetation, found on exposed rocky ledges, and MC2 *Festuca rubra-Plantago maritima* maritime grassland, typically occurring along more gently sloping upper cliff zones (Perrin *et al*., 2014). This assessment updates previous national evaluations, incorporating new spatial datasets and aerial interpretation, and provides an overview of the current condition and conservation outlook for habitat 1230 in Ireland.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2005-2025***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information Optional	The distribution map for 1230 vegetated sea cliffs is based primarily on the national survey carried out by Barron *et al.* (2011), which analysed oblique aerial photographs taken in 2003. This dataset was also used in the 2019 reporting period. For 2024, the same dataset was retained as a base, but all locations were reviewed and updated through visual analysis using high-resolution aerial imagery from Google Earth, OSI Discovery Series maps, and geological layers from Map Genie and the GSI. A further ten undocumented sites from Browne (2000) were also included in the distribution, as was the case in 2019. These are areas where no remote imagery is available but which were previously recorded in the national inventory. This approach ensures a consistent and robust representation of the distribution of habitat 1230 for the current reporting cycle.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Previous assessment was completed in 2007, 2013 and 2019 establishing baseline data on conservation status and trends indicating that sea cliffs were largely stable.
3.4 Sources of information	Barron, S.J., Delaney, A., Perrin, P.M., Martin, J.R. & O'Neill, F.H. (2011) National survey and assessment of the conservation status of Irish sea cliffs. *Irish Wildlife Manuals*, No. 53. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin. Browne, A. (2000) National inventory of sea cliffs and coastal heaths. Report for the National Parks and Wildlife Service, Dublin. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford.

	Galvin, P. & Lauder, A. (2025) National Parks and Wildlife Service Unpublished report. MERC/EirEco (2010) Ecological Surveys of Coastal Habitats and Species in Ireland. Unpublished report. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland – Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. Cronin, E., O'Hanrahan, B. & O'Neill, F. (2017) Irish Coastal Monitoring Programme: Vegetated Sea Cliffs. Internal report. National Parks and Wildlife Service. Ní Dhúill, D. & Smyth, N. (2018) Invasive species control on Howth Head cliffs: management and monitoring outcomes. Internal report. National Parks and Wildlife Service. NPWS (2024) Special Areas of Conservation (SACs) Shapefile – ITM Projection (2024 edition). [shapefile] Available at: https://www.npws.ie/sites/default/files/files/SAC_ITM_2024_12.zip. Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014) National Survey of Upland Vegetation and Habitats: Classification and Evaluation. *Irish Wildlife Manuals*, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***24,000 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
4.3 Short-term trend Period	***2013-2024***
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*

4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 24,000 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*

	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	The current range total of 240 coastal 10x10 km grid cells is based on spatial updates made during the 2019 assessment. At that time, a full review of the distribution data was carried out. This involved removing 18 inland grid cells that did not intersect the coast and re-adding two previously excluded coastal grid cells (L59 and V28) based on their continued suitability for the habitat. One grid cell (S40) was removed and one grid cell (O30) was added due to technical refinements in spatial processing. These changes reflect improved methodological consistency rather than any actual shift in the extent of the habitat. As such, the net Range and Favourable Reference Range figures remain unchanged since 2019.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2005-2011***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***54.83 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	

	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c)* ***the use of a different method*** *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.15 Favourable reference area	*a) In km²*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) The reference value was recalibrated through GIS analysis, integrating historical cartographic data, high resolution imagery ensuring accurate assessment of vegetated sea cliff habitat area	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The mapping and calculations made for reporting in 2019 (NPWS, 2019), when cliff area was estimated at 54.83 km², were used as the baseline for the 2025 assessment. In this reporting cycle, a minor natural cliff collapse resulted in a loss of approximately 0.0017 km². This represents a rate of change of just -0.0031% and is considered negligible, as natural erosion is an expected process in dynamic coastal systems like sea cliffs. Additionally, refinements in GIS mapping methods led to a slightly more accurate area measurement, now estimated at 54.8283 km². The minor change is therefore attributed both to natural geomorphological processes and to improved mapping methods, not to a significant ecological decline.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***48.55 km²***
		Maximum	***48.55 km²***
	b) Area in not-good condition	**Minimum**	***6.28 km²***
		Maximum	***6.28 km²***
		Minimum	***0 km²***

	c) Area where condition is not known	**Maximum**	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	Barron *et al.* (2011) created the list of typical species, which is the same as it was during the last reporting period (2013-2019). Appendix III of Barron *et al.* (2011) includes the list of typical species used to evaluate this habitat type, which remains valid for this reporting round. The list of typical species is the same as the list presented during the last reporting period (NPWS 2019): *Agrostis stolonifera, Anthyllis vulneraria, Armeria maritima, Caloplaca* spp*., Calluna vulgaris, Crithmum maritimum, Daucus carota, Equisetum* spp*. Festuca rubra, Lonicera periclymenum, Plantago maritima, Ramalina* spp*., Silene uniflora, Tussilago farfara, Verrucaria maura, Xanthoria* spp*.*		
6.8 Additional information *Optional*	This report is supported by a desk-based study of 1,227 sea cliffs across Ireland (Barron *et al.*, 2011). The habitat is considered generally stable, with 88.55% (48.55 km²) of the area assessed as in good condition and 11.45% (6.28 km²) in not-good condition. No monitoring stops were recorded during this reporting period; condition was estimated based on interpretation of aerial imagery and existing GIS data. While most of the habitat remains in *Favourable* condition, pressures from coastal development, erosion, and quarrying contribute to localised deterioration. In the absence of field surveys, Structure and functions are assessed as *Unfavourable-Inadequate* with a *stable* trend.		

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	High
PE01 Roads, paths, railroads and related infrastructure	Ongoing	Minority <50%	Medium
PE03 Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging)	Ongoing	Minority <50%	Medium
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PJ04 Sea-level rise due to climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing	Minority <50%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	*Gunnera tinctoria* (Giant Rhubarb)
f) Other invasive alien species *Optional*	*Carpobrotus edulis* (R02862) (Hottentot-fig)
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	This report is supported by a desk-based study of 1,227 sea cliffs across Ireland (Barron *et al.*, 2011). Various anthropogenic and natural pressures were observed across the network. At Arklow Head, quarry expansion and associated infrastructure have led to vegetation removal and habitat disturbance (PC01, PF01). The Cliffs of Moher are subject to continued quarrying and natural erosion, particularly along

	exposed cliff edges (PC01, PM07). Sea defence structures at Mount Brandon and Kerry Head have altered natural coastal processes, notably sediment transport and erosion dynamics (PF15). At Moveen to Bridge of Ross, quarrying and increased human activity, including path creation and erosion, have affected cliff face stability and vegetation cover (PE01, PM07, PC01). A notable cliff collapse occurred at Three Castle to Mizen Head, causing localised habitat loss and fragmentation (PM05). In Ballincar, infrastructure development near the cliff has contributed to erosion pressures (PF01, PE01). At Hook Head and Baginbun Head, car park expansion and increased visitor infrastructure have encroached on cliff vegetation (PF05, PE03, PF01). Bray Head's soft cliff faces are under intensified erosional stress due to the adjacent railway infrastructure (PE01, PM07). Further inland development and dispersed habitation at Rineen and Tully have contributed to vegetation loss and erosion through footfall and surface instability (PF01, PM07). Across several sites, invasive alien species such as *Carpobrotus edulis* and *Gunnera tinctoria* remain active pressures (PI01, PI02). Notable pressures have been observed from *Carpobrotus edulis* (R02862) (Hottentot-fig) and *Gunnera tinctoria* (Giant rhubarb), which continue to affect specific sites. These species, one of which is listed as being of Union concern, are highly invasive in coastal habitats. Previous management measures, such as targeted herbicide application and habitat restoration efforts, have shown success in reducing their presence. Continued surveillance and adaptive management are required to prevent their re-establishment and mitigate impacts on native vegetation and habitat structure. Monitoring remains essential to ensure early detection and management of potential IAS listed under Union regulations. These observations highlight key pressures, including construction, tourism, natural erosion, and invasive species, which continue to influence vegetated sea cliff habitats nationwide. Continued GIS monitoring and review of aerial imagery are essential to track and respond to these evolving threats. In assigning levels of influence, both the local impact of each pressure and the spatial extent of its occurrence were taken into account. Where pressures were clearly visible – such as vegetation loss, erosion, or trampling – but limited in scope, they were typically classed as having a 'medium' influence. Pressures with a lower apparent impact or frequency were assigned as 'low'. With the exception of PC01, no pressures were judged to be widespread or severe enough to warrant a 'high' influence rating across the habitat. The absence of consistent ground-truthing across all sites may have affected the ability to fully capture subtler or small-scale impacts.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MF02 Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (i.e., regulation or zoning to control coastal development and recreational use) ME06 Habitat restoration of areas impacted by transport MI03 Management, control or eradication of other alien species MJ01 Implement climate change mitigation measures MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change (i.e., habitat management to address natural succession of vegetation)
8.7 Additional information *Optional*	The conservation measures noted in section 8.6 are based on site-level observations across a range of vegetated sea cliff locations assessed during a desk survey during the 2019-2025 reporting period (Galvin & Lauder, 2025). These measures reflect documented responses to specific pressures or threats recorded at individual sites. At the Cliffs of Moher, new road construction near the cliff face and active quarry expansion contributed to erosion and instability. Measures such as MF02 (regulation of coastal development) and ME06 (habitat restoration of areas impacted by transport infrastructure) have been implemented in response. In Rineen, cliff damage from quarrying and degradation caused by old access paths were observed. Measures including MF02 and MM01 (habitat management to address vegetation succession) have been implemented in relation to these pressures. Implementation of invasive alien species control (MI03) was documented, particularly at Howth Head and Clare Island, based on earlier work including Cronin *et al*. (2017) (Ní Dhúill & Smyth, 2018). Broader responses to climate-related pressures (MJ01 Implementation of climate change mitigation and adaptation measures) have also been documented by Cronin *et al*. (2017). Based on pressures observed and the current overall condition of the habitat, MF02, ME06 and MM01 are considered the most relevant additional measures needed to achieve or maintain favourable conservation status – particularly at sites experiencing erosion, vegetation loss, or unmanaged access. MI03 and MJ01 would be beneficial from a longer-term resilience perspective but are not essential at this stage, as the pressures they address are either localised or not yet widespread.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The short-term trend direction of Range is assessed as *stable*. The current range is equal to the Favourable Reference Range, as there have been no significant changes observed. Conservation status of Range is therefore *Favourable*. The future trend of Range is assessed as *stable*, with no anticipated changes in the next two reporting periods. Future prospects of Range are therefore *Good*. The short-term trend direction of Area is also assessed as *stable*, with negligible anthropogenic losses identified within the last two reporting periods. The current area aligns with the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. The future trend of Area is assessed as *stable*, with no substantial changes projected based on identified threats and pressures. Future prospects of Area are therefore *Good*. For Structure and Functions, the short-term trend direction is *stable* for habitat that remains in good condition. Current Structure and functions are assessed as *Unfavourable-Inadequate*, as 88.55% of the habitat is considered in good condition, with 11.45% affected by pressures. The future trend of Structure and functions is assessed as *stable*, with no substantial changes projected based on identified threats and pressures. Future prospects of Structure and functions are therefore *Good*. The SAC shapefile used was the most up-to-date version available from the NPWS GIS Unit, Shapefile SAC_ITM_2024_12.shp.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV)* ***/ Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV)* ***/ Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV)* ***/ Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating / **stable** / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	There have been no significant anthropogenic losses in habitat area since the Directive came into force, with overall losses remaining negligible. However, a marginal decline in vegetated sea cliff habitat has been identified during this reporting period, attributed to a natural cliff collapse. Pressures such as infrastructure development, invasive alien species and climate change continue to operate but do not appear to be escalating. Therefore, Structure and functions, and hence the Overall Conservation Status, are assessed as *Unfavourable-Inadequate*, and the Overall trend in Conservation Status is considered *stable*.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

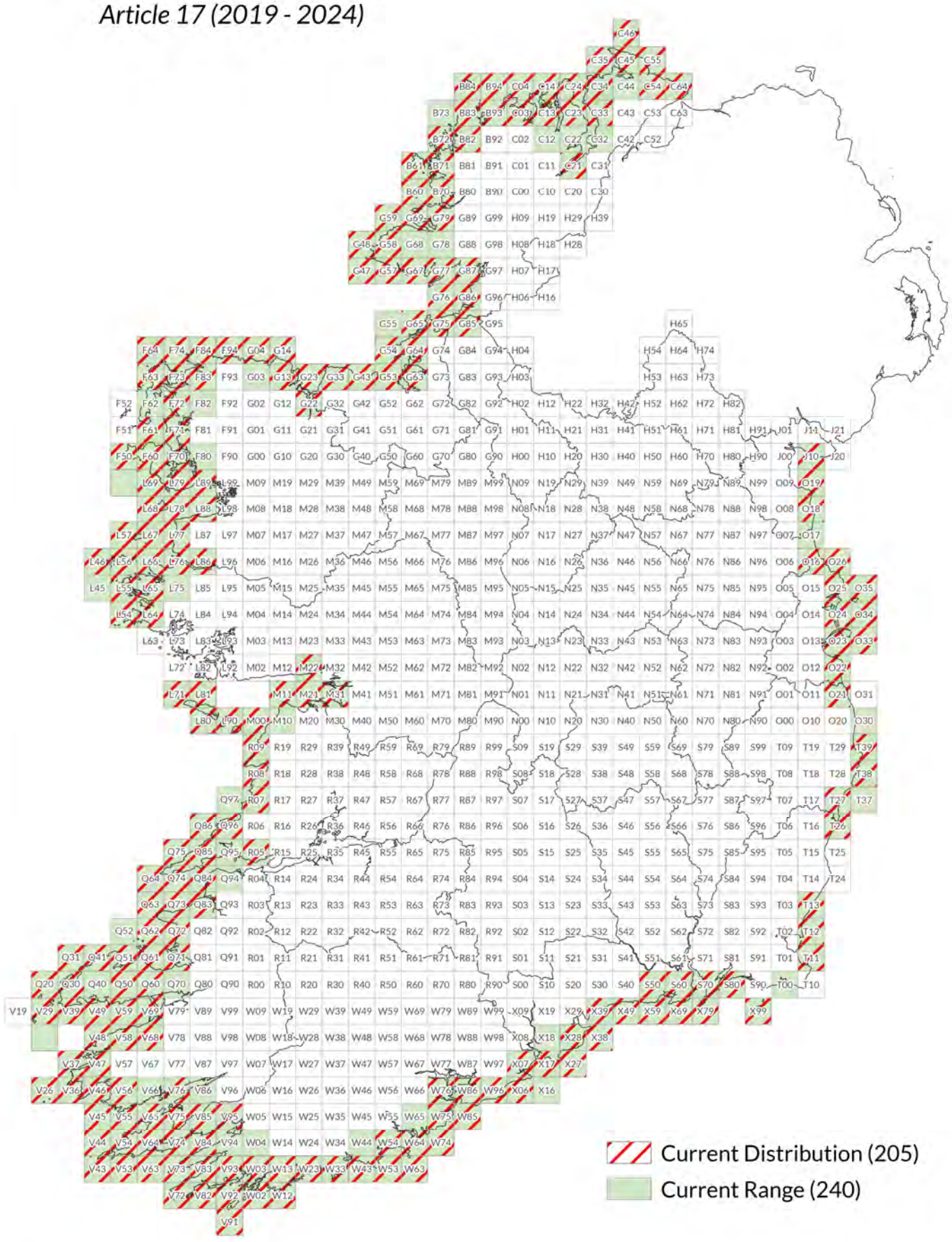
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***27.19 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	By executing an intersection between the distribution shapefile and the SAC shapefile, the area within the SAC network and related trend were determined. The total area of 1230 habitat in SACs nationwide, including some SACs where the habitat has not been listed as a qualifying interest (QI), is indicated in section 11.1. The area of 1230 in the SAC network where it is designated as a QI is 18.97 km^2. Shapefile SAC_ITM_2024_12.shp was used for the assessment.

12 Complementary information *N/A*

Vegetated sea cliffs (1230)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1310 *Salicornia* and other annuals colonising mud and sand**
1.2i Habitat short name	***Salicornia* mud**
1.3i Habitat description	*Salicornia* and other annuals colonising mud and sand (1310) is a pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh, or form patches within other saltmarsh communities where the elevation is suitable and there is regular tidal inundation. The Interpretation Manual of EU Habitats (European Commission, 2013) defines habitat 1310 as annuals belonging mainly to the genus *Salicornia* that colonise periodically inundated muds and sands of marine or interior salt marshes and belong to the phytosociological classes *Thero-Salicornietea*, *Frankenietea pulverulentae* and *Saginetea maritimae*. Only vegetation from the first and third class is known in Ireland. There are several sub-types listed and four British National Vegetation Classification (NVC) plant communities (Rodwell, 2000) are listed: SM7 *Arthrocnemum perenne* stands, SM8 Annual *Salicornia* saltmarsh, SM9 *Suaeda maritima* saltmarsh, and SM27 Ephemeral saltmarsh vegetation with *Sagina maritima*. In Ireland, three sub-types are recognised: (1) *Salicornia* type (2) *Suaeda* type and (3) the much rarer *Sagina* type. Mono-specific swards of *Salicornia* spp. growing on muddy sediments are the most common plant community belonging to this Annex I habitat type found in Ireland. According to the Irish Vegetation Classification (IVC) (Perrin, 2016; Perrin, 2024), the habitat equates to the community SM1A *Salicornia* agg. saltmarsh. The NVC plant community SM7 is characteristic of a different Annex I saltmarsh community: Mediterranean and thermo-Atlantic Halophilous scrubs (1420). This habitat has a very restricted distribution and area, and is not considered part of the 1310 *Salicornia* mud habitat. As this habitat is dominated by annuals it can be ephemeral or transient in nature and is highly susceptible to erosion. Its distribution can vary considerably from year to year and it can move in response to changing conditions, e.g. in estuaries with shifting river channels.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1982-2024***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The range and distribution 10 km maps were compiled mainly using polygons mapped as containing 1310 habitat by four separate coastal habitat surveys conducted between 2021 and 2023 (Gallagher *et al.*, in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.). These polygons overlap, and therefore supersede, many of those mapped by surveys that took place in previous reporting periods. However, some polygons from Perrin (2018), Brophy *et al*. (2019) and McCorry & Ryle (2009) remain in the dataset as those areas were not revisited. With no evidence to the contrary they are assumed still to be the 1310 habitat. Point data were also used in the construction of the 10 km maps. These points were from plots, dating from 1982 onwards, from the National Vegetation Database which were identified as 1310 saltmarsh communities through the Irish Vegetation Classification Project (IVC) (Perrin, 2016). Also, following on from NPWS (2019) additional cells were added where 10 km^2 records of *Salicornia* agg. from Preston *et al*. (2002) overlapped with the presence of saltmarsh within a 10x10 km grid cell. All references and sources are detailed in section 3.4. Data sources listed in section 3.4 that recorded the 1310 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g., based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 1310 habitat. Point data derived from analysis of plots from the National Vegetation Database, and included in the distribution, cover a date range of 1982-2009. Plots recorded from 2001 onwards (which included the Saltmarsh Monitoring Project plots) were assigned a certainty of 3, while earlier data (1982-2000) were assigned a certainty of 2. Following a comparison with the distribution from the previous reporting round (NPWS, 2019), one 10x10 km grid cell (V46) was added to the distribution during the current reporting period and five grid cells were removed (F72, L72, L89, Q70, and R15) as the 1310 habitat was no longer recorded within them. This resulted in the distribution decreasing from 103 10x10 km grid cells to 99. Most of these changes were due to natural processes, but one grid cell (R15) was lost from the distribution due to expansion of the non-native species Common Cord-grass (*Spartina* agg.) within the Shannon Estuary (CHSW21 Site 30).

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Brophy, J.T., Perrin, P.M., Penk, M.R., Devaney, F.M. & Leyden, K.J. (2019) Saltmarsh Monitoring Project 2017-2018. *Irish Wildlife Manuals*, No. 108. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. Curtis, T.G.F. & Sheehy Skeffington, M. (1998) The saltmarshes of Ireland: an inventory and account of their geographical variation. *Biology and Environment, Proceedings of the Royal Irish Academy,* 98B, 87-104. Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. EPA, Wexford. Devaney, F.M. & Perrin, P.M. (2015) Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE). End of Project Report. Prepared for the Environmental Protection Agency by BEC Consultants Ltd. 2013-W-DS-10. European Commission (2013) Interpretation Manual of European Union Habitats. EUR28. DG Environment, Brussels. Gallagher, M.C. & Crushell, P. (in prep.). Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Horton, B.P., Shennan, I., Bradley, S.L., Cahill, N., Kirwan, M., Kopp, R.E. & Shaw, T.A. (2018) Predicting marsh vulnerability to sea-level rise using Holocene relative sea-level data. *Nature Communications,* 9, 2687-2690. Image, M. & Forster Brown, C. (2018) Baseline Analysis of Actions under GLAS: Full Report. Report for the Department of Agriculture, Food and the Marine. McCorry, M. (2007) Saltmarsh Monitoring Project 2006 – Summary Report. Unpublished report for the National Parks and Wildlife Service, Dublin. McCorry, M.J. & Ryle, T. (2009) Saltmarsh Monitoring Project 2007-2008: Final report. Unpublished report for the National Parks and Wildlife Service, Dublin. National Vegetation Database. National Biodiversity Data Centre. Available at http://www.biodiversityireland.ie/projects/national-vegetation-database/

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.

NPWS (2016) Conservation Objectives: Lackan Saltmarsh and Kilcummin Head SAC 000516. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

NPWS (2017) Conservation Objectives: Akeragh, Banna and Barrow Harbour SAC 000332. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Perrin, P.M. (2016) Irish Vegetation Classification Technical Progress Report No. 2. Unpublished report by BEC Consultants for the National Biodiversity Data Centre. http://www.biodiversityireland.ie/wordpress/wp-content/uploads/IVC_Technical-Progress-Report-No.2.pdf. 34pp.

Perrin, P.M. (2018) SAMFHIRES (Saltmarsh Function and Human Impacts in Relation to Ecological Status) unpublished field survey data. EPA-Funded collaboration between BEC Consultants Ltd and Trinity College Dublin.

Perrin, P.M. (2024) Handbook for the Irish Vegetation Classification. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024.

Preston, C.D., Pearman, D.A. & Dines, T.D. (2002) *New Atlas of the British and Irish Flora.* Oxford University Press.

Rigoni, P., Lupieri, G., Rodi, E. S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Rodwell, J.S. (Ed.) (2000) *British plant communities*, volume 5. Maritime communities and vegetation of open habitats. Cambridge University Press, Cambridge, UK.

Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal Monitoring Project. A report to the National Parks and Wildlife Service, Dublin.

Wymer, E.D. (1984) The phytosociology of Irish saltmarsh vegetation. M.Sc. Thesis, National University of Ireland, Dublin.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***14,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***2%***
	b) Estimated Maximum	***2%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 15,200 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 1310 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Following a similar procedure to the one carried out in 2019, twelve 10x10 km grid cells generated by the range tool that had no suitable coastline (e.g. cliffs were considered unsuitable) or no estuarine habitat were removed. The 12 grid cells removed were B92, C43, G76, M00/10, O08, Q82, R06, S91, V63, W97/98. The resulting range is 14,900 km² (range tool output of 16,100 km² minus 1,200 km² for the 12 removed 10x10 km grid cells). A similar methodology was applied in NPWS 2019, with eleven 10x10 km grid cells removed due to no coastline or suitable estuarine habitat. As the number of removed 10x10 km grid cells has increased slightly from 11 to 12, this is</td></tr>
</table>

	recorded as a 'the use of different method' in section 4.2, as the criteria applied and the available remote imagery will have differed slightly. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). As the impact of the invasive plant species Common Cord-grass (*Spartina* agg.) led to a loss of a 1310 site from the Shannon Estuary (10x10 km grid cell R15) and a contraction in the range, the short-term trend is assessed as *decreasing*. As the range has decreased by 300 km² this is a 2% reduction since the last reporting period (NPWS, 2019). The number of 10x10 km grid cells in the non-corrected range (161 cells before those cells with no suitable habitat were removed) is two cells lower than the last monitoring period (NPWS, 2019). This change is partly due to actual change due to the invasive *Spartina* spp. and partly due to natural processes, particularly natural succession from 1310 to 1330 as occurred at Tullaghan Bay to Doonagh (CHNW21 Site 3). The Favourable Reference Range (FRR) is retained as 15,200 km², the same as the last reporting period (NPWS, 2019). The current range is smaller than the FRR. This is partly due to the loss of the habitat from 10x10 km grid cell R15, partly due to natural succession from 1310 to 1330, and partly due to minor changes in methodology.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2006-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.25 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown*	

	f) yes, due to other reasons	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.58%***
	b) Estimated Maximum	***0.58%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 2006 (McCorry, 2007) when the pilot baseline survey was carried out, and incorporates updates made by surveys carried out between 2006 and 2023, the details of which are listed in section 3.4, namely McCorry & Ryle (2009), Brophy et al. (2019), Perrin (2018), Rigoni et al. (in prep.), Gallagher et al. (in prep.) and NPWS (in prep.).

There are still areas of unmapped 1310 habitat in the country, mostly in the form of narrow fringes along the shoreline. Some such areas were recorded during the 2017-18 and 2021-23 surveys; however, all significant saltmarsh areas have been covered by McCorry (2007), McCorry & Ryle (2009), Brophy et al. (2019), Perrin (2018), Rigoni et al. (in prep.), Gallagher et al. (in prep.) and NPWS (in prep.), either via field survey or desk study.

Favourable Reference Area (FRA) was not determined exactly by NPWS (2019), but was estimated to be approximately equal to the reported extant area. The same approach is followed for the current reporting period, with the FRA deemed to be approximately equal to the current area, given that some anthropogenic losses have occurred since the Directive came into force and acknowledging that there have also been losses due to natural processes.

The mapped area of 1310 habitat covers 1.25 km^2, an increase of 0.9 km^2 from the figure reported in NPWS (2019). The 1.25 km² is reported as a minimum area, as the range reported in section 4 includes</td></tr>
</table>

	saltmarsh vegetation plots from the National Vegetation Database and 10 km^2 records of *Salicornia* agg. from Preston *et al*. (2002) for which no area is currently reported. During the current reporting period, 38 sites containing the 1310 habitat were visited and assessed for Area. These 38 sites cover 1.21 km^2 of 1310 habitat and make up 96.8% of the total area of 1310 habitat recorded in Ireland. This represents a significant proportion of the total area of 1310, covering all coasts, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Short-term trend in Area was deemed to be *decreasing*, which is a change from *stable* that was reported in NPWS (2019). The only type of anthropogenic losses recorded during the current reporting period are due to invasion by the non-native species Common Cord-grass (*Spartina* agg.). A second type of loss was caused by successional change to 1330 Atlantic salt meadows. This is not deemed to be anthropogenic in origin, although the root cause of succession is not always easy to determine and could conceivably be caused by human-induced impacts such as sea level changes as a consequence of climate change. Since the last reporting period, 0.73 ha of 1310 habitat have been lost due to *Spartina* agg. invading and replacing the 1310 habitat. This represents a 0.58% loss in the national area at a rate of 0.19% per annum (on average, the 0.58% loss occurred over 3 years). Loss of 0.005% was noted in the previous reporting round, and this was deemed to be negligible. The long-term trend in Area was also deemed to be *decreasing*, which is a change since the last two reporting periods when it was recorded as *stable* (NPWS, 2013, 2019).

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.53 km²***
		Maximum	***0.53 km²***
	b) Area in not-good condition	**Minimum**	***0.72 km²***
		Maximum	***0.72 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same to that utilised during the last reporting period (NPWS, 2019). Where sites surveyed in 2021-23 were previously surveyed, where possible, plots were repeated in the same locations. New plot locations were chosen where it was not possible to repeat an existing plot and at sites not previously surveyed. Plots measured 2 m x 2 m and all species within the plots were recorded. The species listed below were assessed as part of the site assessment criteria. For further details, see Brophy *et al*. (2019) and Rigoni *et al*. (in prep.), Gallagher *et al*. (in prep.) and NPWS (in prep.). The typical species used in assessing the 1310 habitat are: *Puccinellia maritima*, *Salicornia europaea* agg., *Salicornia pusilla*, *Parapholis strigosa*, *Plantago coronopus*, *Sagina maritima*, *Sagina nodosa* and *Suaeda maritima.*
6.8 Additional information *Optional*	During the current reporting period, 0.89 km^2 of 1310, distributed across 17 sites and 26 subsites, were assessed for Structure and functions. The assessed area represents 71.2% of the total area of 1310 habitat recorded in Ireland. This is a significant proportion, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Of the total area assessed for Structure and functions in this reporting period, 42.6% (0.38 km^2) of the area was assessed as *Favourable* and 57.4% (0.51 km^2) was assessed as *Unfavourable*. Given that the assessed area represents a significant proportion of the 1310 recorded in Ireland, these percentages can be applied to the total area of the habitat to give 0.53 km^2 in good condition, and 0.72 km^2 not in good condition. The fact that less than 75% of the habitat is in good condition equates to an assessment of *Unfavourable-Bad* for Structure and functions. The approach used to estimate the percentage of the 1310 habitat in *Unfavourable* condition at each subsite is as follows: If none of the assessment criteria failed at the site level then 90-100% of the 1310 area was classified as being in good condition; if any criteria failed, then over 10% of the habitat was considered to be in

	poor condition. Generally speaking, where one to two criteria failed at the site level, less than 25% of the 1410 area was considered to have *Unfavourable* Structure and functions. Where three or more assessment criteria failed, more than 25% of the 1410 area at the site was generally considered to be in poor condition. The two most frequent assessment criteria to fail were 'Negative indicator species (cover of *Spartina* spp.)' and 'Presence of *Spartina* spp. within vicinity of habitat' which failed at 42.3% and 23.1% of assessed subsites overall. During the last two reporting periods, 90% (2019) and 90.6-99.5% (2013) of the 1310 habitat was assessed as *Favourable* (NPWS, 2019). Because the percentage of 1310 habitat assessed as *Favourable* in the current reporting period (42.6%) is well below these figures, even allowing for different surveyors and the change in methodology, the short-term trend of habitat area in good condition must be assessed as *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Low
PK02 Mixed source marine water pollution (marine and coastal)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Spartina* spp.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data*

	c) Based mainly on expert opinion with very limited data *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni P., Lupieri, G., Rodi, E. S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats listed in section 7.1 were selected and ranked based on a combination of frequency of occurrence, intensity (high, medium or low), and area of impact, using the data gathered during the 2021-23 coastal surveys (see 7.3 for sources). In addition, all pressures presented in NPWS (2019) were considered for the current reporting period. Of the two medium-ranked pressures listed in NPWS (2019) both were retained as high ranking for the current monitoring period: PI02 (formerly coded as I02), and PA07 (formerly PA09). Section 7.1 lists the main three pressures first, ranked on the basis of frequency, severity of influence, and area affected. These are widespread impacts characterised by medium-intensity effects where they were recorded, and so they are assessed as having high – medium influence nationally. The other five pressures were relatively minor and were recorded within less than 1% of the 1310 area surveyed, and they were therefore assessed as having low influence. The most significant pressure reported during the current reporting period is PI02 'Other invasive alien species'. This relates to *Spartina* spp. invasion, which was recorded at 20 of the surveyed sites and subsites during the current reporting period. This is listed as the top pressure as it affects large areas (42% of the 1.21 km² surveyed), affecting both Area and Structure and functions, and its influence was deemed by surveyors to be high in almost all cases. PA07 'Intensive grazing or overgrazing by livestock' usually took the form of trampling and poaching of saltmarsh habitat. The impact was recorded at four of the surveyed sites and subsites and 5% of the 1.21 km² survey area was affected. PA17 'Agricultural activities generating pollution to surface or ground waters including marine' was recorded at two sites (1% of the 1.21 km² surveyed). The presence of dense green algae was recorded as the result of pollution, with excessive algal growth thought to be caused by nutrient enrichment from run-off from surrounding agricultural land. The other five pressures recorded during the current reporting period were each only recorded at one site and less than 1% of the survey area. PA10 'Livestock farming without grazing' was recorded due to the negative impact of ring feeders at one site. PA25 'Agriculture

	activities not referred to above' was used to record disturbance from vehicle tracks and PF05 'Sports, tourism and leisure activities' recorded disturbance from off-road driving at one site. PF07 'Residential and commercial activities and structures generating pollution to surface or ground waters' refers to pollution discharged from a wastewater pipe at one site and PK02 'Mixed source marine water pollution marine and coastal' refers to green algal growth due to nutrient enrichment/pollution from an unknown source. As in NPWS (2019), climate change has not been added as an impact of medium or high importance for the 1310 habitat, but it is likely to affect its range over the coming decades. The long-term trend will see an increase in mean sea level and extreme weather events (Desmond *et al*., 2017), which will impact the formation, stabilisation and vegetation communities of the 1310 habitat. In particular, there may be a higher incidence of succession to non-Annex habitats such as swamp. Furthermore, climate change may have unknown impacts on the physiology of invasive species such as *Spartina* spp. that may increase the spread of these species in saltmarsh habitats.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MF02 Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	Two managed realignment projects were identified in the course of the SAMFHIRES project (Perrin, 2018): one at Turvey, Rogerstown Estuary, Co. Dublin, within the Rogerstown Estuary SAC (site code 000208), recorded as CA15 in NPWS (2019), now recorded as MA13; and the other at Kilmacleague, Tramore, Co. Waterford, outside but adjacent to the Tramore Dunes and Backstrand SAC (site code 000671), recorded as CF02 in NPWS (2019) but now recorded as MF02. The measures are detailed in full in NPWS (2019). Saltmarsh habitats were not targeted by any of the actions listed for the GLAS agri-environment scheme (Image & Forster Brown, 2018), but saltmarsh habitats are recognised in the ACRES Co-operative (CP) scheme in the scorecard for 'coastal grassland habitats', which includes dunes, machair and saltmarsh. Payments are results-based, i.e. linked to scorecard results, thus incentivising landowners to lessen or eliminate negatively scoring issues such as pollution or habitat damage, so as to qualify for higher payments. The measures employed by landowners to address issues noted on ACRES CP scorecards may be varied and could fall under a number of different conservation measure codes. For the purposes of this report, the two most appropriate codes, which should cover the majority of cases, are deemed to be MA05 and MA10.

	Measures recommended to improve the Structure and functions of the habitat but that are not yet being implemented include**:** MI03 Management, control or eradication of other invasive alien species MF07 Reduce/eliminate pollution (incl. noise, light, heat, soil pollution) from industrial, commercial, residential and recreational areas and activities MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 could be considered for *Spartina anglica* but given the complexity of the issue this would need to be subject to a comprehensive assessment. This is no doubt the reason for the exclusion of *Spartina anglica* from the ACRES CP invasive species assessment. As noted in NPWS (2019), from a long-term standpoint, MJ02 (recorded in 2019 as CN02) 'Implement climate change adaptation measures' is likely to be required to address the issue of climate change. Sea level rise will impact negatively on 1310 area (Horton *et al*., 2018) and measures such as managed retreat may be required to maintain 1310 Area and Structure and functions parameters.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / **Poor** / Bad / Unknown*
	c) Structure and functions	*Good / Poor / **Bad** / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *decreasing* from 15,200 km^2 to 14,900 km^2. Current range is 2% less than the Favourable Reference Range. Conservation status of Range is therefore *Unfavourable-Inadequate*. Future trend of Range is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1310 habitat, and restore the FRR of 15,200 km^2. Future prospects of Range are therefore *Poor*. Short-term trend direction of Area is assessed as *decreasing*, with a loss of 0.58% of the total surveyed area recorded during the current reporting period. Current area is <10% less than the Favourable Reference Area and the rate of decrease is <1% per year on average over the past two reporting periods. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1310 habitat, and increase the habitat area to the FRA.	

	Future prospects of Area are therefore *Poor*. The percentage of 1310 habitat in good condition is 42.6% and the percentage not in good condition is 57.4%. More than 25% of the habitat not in good condition corresponds to an *Unfavourable-Bad* assessment. The conservation status of Structure and functions is therefore *Unfavourable-Bad.* The current Structure and functions assessment of 42.6% of 1310 habitat in good condition is down from 90% in the last reporting period. The short-term trend direction of Structure and functions is therefore *decreasing* for habitat that is in good condition, but it should be noted that some of this decrease is likely due to differences among surveyors' perceptions and changes in the location and distribution of monitoring stops. Future trend of Structure and functions is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1310 habitat. As the current conservation status of Structure and functions is *Unfavourable-Bad*, the Future prospects of Structure and functions are also assessed as *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	***d) yes, due to the use of different method***

	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): ***genuine change** / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Unfavourable-Inadequate* in this reporting period, which has changed from *Favourable* in the previous reporting period. This is due to the impacts of the invasive species *Spartina* displacing the 1310 habitat and due to natural succession from 1310 to 1330 Atlantic salt meadows. The Conservation Status of Area is *Unfavourable-Inadequate*, which has changed from *Favourable* during the previous reporting period. Loss of habitat continues to occur due to *Spartina* invasion into the 1310 habitat. The Conservation Status of Structure and functions and Future prospects were assessed as *Unfavourable-Bad* during this reporting period, a change from *Favourable* in the previous reporting period. The main reason for this is the high cover of *Spartina* within the 1310 habitat and the presence of *Spartina* within the vicinity of the habitat. The Overall Conservation Status was assessed as *Unfavourable-Bad*, a deterioration from *Favourable* during the last reporting period. The assessment of *Unfavourable-Bad* during the current reporting period is due to the current Range and Area being below the Favourable Reference Range and Favourable Reference Area, the Range and Area of the habitat decreasing, and the Structure and functions and Future prospects deteriorating to *Unfavourable-Bad.* Based on the results of the 2021-23 surveys, *Spartina* is the main issue affecting the 1310 habitat at present. During the last round of reporting (NPWS, 2019) *Spartina* was not assessed to be such an issue with no evidence that *Spartina* cover had increased nationally since the previous reporting period in 2013 (NPWS, 2013). It is unclear what factors are driving the current expansion of *Spartina* cover in Ireland.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.25 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	

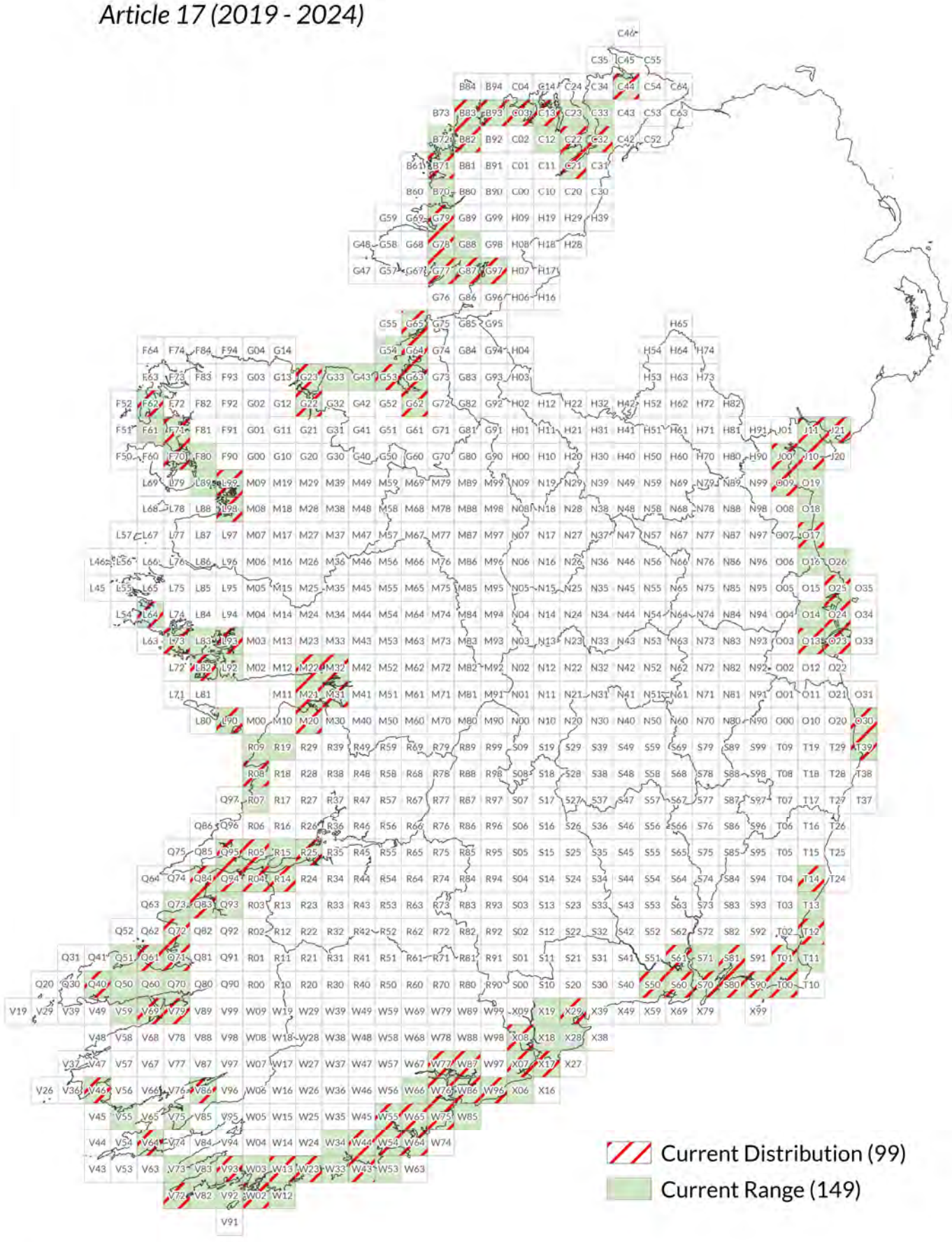
11.3 Surface area of the habitat type inside the network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile. The area given in section 11.1 is the total minimum area of 1310 habitat within SACs in the country, including some SACs where 1310 is not listed as a qualifying interest (QI). The 1.25 km² is reported as a minimum area, as the range reported in section 4 includes saltmarsh vegetation plots from the National Vegetation Database and 10 km^2 records of *Salicornia* agg. from Preston *et al*. (2002) for which no area is currently reported. Almost the total area of mapped 1310 habitat is within an SAC, with only a few small mapped areas outside the SAC network, such as a few of the 1310 areas within Dungarvan Bay (site 53). The minimum area of 1310 within the SAC network where it is listed as a QI is 1.14 km^2. The area of 1310 habitat lost from SACs due to anthropogenic factors is 0.73 ha, which is the total area of 1310 habitat loss recorded during

	the current reporting period. All area loss was from three SACs where the 1310 habitat is a QI, the SACs are Castlemaine Harbour SAC (000343), Dundalk Bay SAC (000455) and Lower River Shannon SAC (002165). During the previous reporting period, 100% of the 0.003 ha of the 1310 habitat lost due to anthropogenic activities was from within an SAC where 1310 is listed as a QI (NPWS, 2019). No evidence of anthropogenic loss of 1310 habitat within SACs was reported for the 2013 reporting period, though losses due to natural processes were recorded (NPWS, 2013). Due to the pioneer nature of the 1310 habitat, it is often ephemeral and its presence will vary over a short timeframe as natural processes operate to create and destroy the conditions required for its presence. In the absence of evidence of anthropogenic activities leading to the loss, its absence from a site during any given survey is not of high concern. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 1310 habitat nationally (see section 6.4 and 6.8), as almost all of the 1310 habitat surveyed during the last two reporting periods was within the SAC network. The surface area of 1310 habitat within the Natura 2000 network has decreased slightly from the previous reporting period; this is in part due to genuine change, mainly due to losses caused by *Spartina*, but may also be due to a change in methodology, in particular in relation to how *Spartina* losses are mapped. As noted previously, area changes due to *Spartina* expansion account for all of the losses in 1310 area mapped within this monitoring period.

12 Complementary information *N/A*

Salicornia mud (1310)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**
1.2i Habitat short name	**Atlantic salt meadows**
1.3i Habitat description	Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on the medium to large-sized saltmarshes. Atlantic salt meadows contain several distinctive zones that are related to elevation and submergence frequency. The lowest part along the tidal zone is generally dominated by Common Saltmarsh-grass (*Puccinellia maritima*) with species like glassworts (*Salicornia* spp.), Annual Sea-blite (*Suaeda maritima*) and Lax-flowered Sea-lavender (*Limonium humile*) also important. The invasive Common Cord-grass (*Spartina anglica*) can be locally abundant in this habitat. The mid-marsh zones are generally characterised by Thrift (*Armeria maritima*) and/or Sea Plantain (*Plantago maritima*). This zone is generally transitional to an upper marsh herbaceous community with Red Fescue (*Festuca rubra*), Saltmarsh Rush (*Juncus gerardii*) and Creeping Bent (*Agrostis stolonifera*). This habitat is also important for other wildlife including wintering waders and wildfowl. Atlantic salt meadows are distributed around most of the coastline of Ireland. The intricate topography of the Irish coastline with many inlets has created an abundance of sites that are sheltered and allow muddy sediments to accumulate, leading to the development of saltmarsh. Atlantic salt meadows can comprise a number of plant communities, including communities from the following groups from the Irish Vegetation Classification: SM2, SM3, SM4, SM6 (Perrin, 2024).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1982-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The range and distribution 10x10 km grid cell maps were compiled mainly using polygons mapped as containing 1330 habitat by four separate coastal habitat surveys conducted between 2021 and 2023 (Gallagher *et al.,* in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.). These polygons overlap, and therefore supersede, many of those mapped by surveys that took place in previous reporting periods. However, some polygons from Perrin *et al*. (2020), Brophy *et al*. (2019) and McCorry & Ryle (2009) remain in the dataset as those areas were not revisited. They are assumed still to be 1330 habitat, unless evidence of habitat loss was found during aerial photograph interpretation. Point data were also used in the construction of the 10 km maps. These points were from plots, dating from 1982 onwards, from the National Vegetation Database which were identified as 1330 saltmarsh communities through the Irish Vegetation Classification Project (IVC) (Perrin, 2016). All references and sources are detailed in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 is the lowest. The new data sources added since the last round of reporting, NPWS (2019), Brophy *et al.* (2019) and Perrin (2018), were judged to be a high certainty of 3. The datasets from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) were both assigned a certainty of 3. These two datasets were based on a detailed field survey and a high certainty of 3 is justified due to the generally stable nature of 1330 and based on the re-survey of a significant proportion of these areas conducted by Brophy *et al.* (2019). Saltmarsh habitat identified via a desk study and aerial photograph analysis as part of the SMP was included in the SMP GIS shapefile. Where the areas identified during the desktop study were not visited in the 2017-2018 survey, they were assigned a certainty of 2. This is based on experience visiting desk study polygons, where saltmarsh was often present, but on occasion there was no saltmarsh, or the type of saltmarsh was incorrectly identified. Point data derived from analysis of plots from the National Vegetation Database, and included in the distribution, cover a date range of 1982-2009. Plots from 2001-2009 (which included the SMP plots) were assigned a certainty of 3, while earlier data (1982-2000) were assigned a certainty of 2. All data with certainty 2 or 3 were used to map the distribution for the 1330 habitat. A comparison of the ranges between the current reporting period and the last (NPWS, 2019) shows that the range has not changed. Comparing the 10x10 km grid cell distributions between the current and previous reporting rounds, a total of three cells have been added in the current round, and none have been lost. This has resulted in the 10x10 km grid cell distribution increasing from 202 cells to 205. This is not thought to represent a genuine change in the distribution between reporting periods, but rather reflects better and more recent data.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Brophy, J.T., Perrin, P.M., Penk, M.R., Devaney, F.M. & Leyden, K.J. (2019) Saltmarsh Monitoring Project 2017-2018. *Irish Wildlife Manuals*, No. 108. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. Curtis, T.G.F. & Sheehy Skeffington, M. (1998) The saltmarshes of Ireland: an inventory and account of their geographical variation. *Biology and Environment, Proceedings of the Royal Irish Academy,* 98B, 87-104. Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. EPA, Wexford. Devaney, F.M. & Perrin, P.M. (2015) Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE). End of Project Report. Prepared for the Environmental Protection Agency by BEC Consultants Ltd. 2013-W-DS-10. Gallagher, M.C. & Crushell, P. (in prep.). Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Horton, B.P., Shennan, I., Bradley, S.L., Cahill, N., Kirwan, M., Kopp, R.E. & Shaw, T.A. (2018) Predicting marsh vulnerability to sea-level rise using Holocene relative sea-level data. *Nature Communications,* 9, 2687-2690. Image, M. & Forster Brown, C. (2018) Baseline Analysis of Actions under GLAS: Full Report. Report for the Department of Agriculture, Food and the Marine. JNCC (2004) Common Standards Monitoring Guidance for saltmarsh habitat. Joint Nature Conservation Committee, Peterborough. McCorry, M. (2007) Saltmarsh Monitoring Project 2006 – Summary Report. Unpublished report for the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. McCorry, M.J. & Ryle, T. (2009) Saltmarsh Monitoring Project 2007-2008: Final report. Unpublished report for the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

	National Vegetation Database. National Biodiversity Data Centre. Available at http://www.biodiversityireland.ie/projects/national-vegetation-database/. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Perrin, P.M. (2016) Irish Vegetation Classification Technical Progress Report No. 2. Unpublished report by BEC Consultants for the National Biodiversity Data Centre. http://www.biodiversity ireland.ie/wordpress/wp-content/uploads/IVC_Technical-Progress-Report-No.2.pdf. 34pp. Perrin, P.M. (2024) Handbook for the Irish Vegetation Classification. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024. http://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/ on 28/09/2018. Perrin, P.M., Waldren, S., Penk, M.R. & O'Neill, F.H. (2020) SAMFHIRES (Saltmarsh Function and Human Impacts in Relation to Ecological Status) unpublished field survey data. EPA-Funded collaboration between BEC Consultants Ltd and Trinity College Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal Monitoring Project. A report to the National Parks and Wildlife Service, Dublin. Wymer, E.D. (1984) The phytosociology of Irish saltmarsh vegetation. M.Sc. Thesis, National University of Ireland, Dublin.

4 Range

Range within the biogeographical/marine region concerned	
4.1 Surface area	***25,900 km²***

4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
	a) 25,900 km²	

<table>
<tr><td rowspan="6">4.12 Favourable reference range</td><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:

☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion
☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information

Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 1330 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Following the procedure carried out in 2019, forty grid cells generated by the range tool that had no coastline or suitable estuarine habitat were removed. The cells removed were B81/92, C02/43, F90/92/93, G12/88, J20, L85/87/97, M03/30, O08/15, Q82, R06/19/17/27/28/29/34, S40/91/92, T03/28, V57/67/77/78/88, W06/14/97/98, X19.

Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the area losses recorded during these two reporting periods led to a contraction in the range. The short-term trend is assessed as stable.

The number of 10x10 km grid cells in the range (259) is the same as the last monitoring period (NPWS, 2019). The same methodology was used in 2025 as in 2019 to derive the distribution of 1330 on which the range was based, including the inclusion of saltmarsh vegetation plots recorded in 1982 (Wymer, 2084). Surveys were carried out between 2021 and 2023 to revisit many of the areas surveyed during previous reporting periods. Areas that were not revisited were either reviewed using aerial imagery or assumed still to be 1330 saltmarsh.

The Favourable Reference Range (FRR) is the same as the last reporting period (NPWS, 2019), and is equal to the current range, reported in 4.1.</td></tr>
</table>

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2006-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***26.99 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.74%***
	b) Estimated Maximum	***0.74%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 2006 (McCorry, 2007) when the pilot baseline survey was carried out, and incorporates updates made by surveys carried out between 2006 and 2023, the details of which are listed in section 3.4, namely McCorry & Ryle (2009), Brophy *et al*. (2019), Perrin (2018), Rigoni *et al*. (in prep.), Gallagher *et al.* (in prep.) and NPWS (in prep.). There are still areas of unmapped 1330 habitat in the country, mostly in the form of narrow fringes along the shoreline in places. Some such areas were recorded during the 2017-18 and 2021-23 surveys; however, all significant saltmarsh areas have been covered by McCorry (2007), McCorry & Ryle (2009), Brophy *et al.* (2019), Perrin *et al.* (2018), Rigoni *et al*. (in prep.), Gallagher *et al*. (in prep.) and NPWS (in prep.), either via field survey or desk study. In NPWS (2019), Favourable Reference Area (FRA) was not determined exactly, but was estimated to be larger than the reported extant area. The difference was estimated to be less than 10%. The same approach is followed for the current reporting period, with the FRA deemed to be less than 10% greater than the current area, given that some anthropogenic losses have occurred since the Directive came into force and acknowledging that there have also been losses due to natural processes. The mapped area of 1330 habitat covers 26.99 km^2, a decrease of 0.2 km^2. During the current reporting period, 74 sites containing 1330 were visited and assessed for Area. These 74 sites cover 22.80 km^2 of 1330 habitat and make up 84.5% of the total area of 1330 habitat recorded in Ireland. This represents a significant proportion of the total area of 1330, covering all coasts, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Short-term trend in Area was deemed to be *decreasing*. Two types of anthropogenic loss were noted: direct and often irreversible losses due to activities such as construction or conversion to agricultural land); and less direct losses due to invasion by non-native species such as common cord-grass (*Spartina* agg.) and sea buckthorn (Hippophae rhamnoides). A third type of loss was caused by successional change to other native habitats, such as swamp or scrub. This is not deemed to be anthropogenic in origin, although the root cause of succession is not always easy to determine and could conceivably be caused by human-induced impacts such as sea level changes as a consequence of climate change. Only anthropogenic changes are considered in this assessment. Since the last reporting period, 0.32 ha of 1330 were lost to direct anthropogenic activities, which represents 0.01% of the area surveyed in the period 2021-23. These losses occurred across four of the sites surveyed. A further 13.12 ha were recorded as lost due to *Spartina*, compared to the area mapped in the last monitoring period. Non-

	anthropogenic successional change accounted for 2.08 ha of loss of 1330 habitat. Mapping of 1330 loss due to *Spartina* expansion is problematic, as the density of *Spartina* can vary, and it may be difficult to determine if 1330 habitat is still present throughout the sward (albeit in poor condition) or if it has been completely lost and transformed to a pure *Spartina* sward. Interpretation of aerial imagery is a useful technique to gauge the extent of *Spartina* invasion, but it may overestimate losses of 1330 habitat in cases where the infestation is patchy and 1330 still persists underneath. In total, the 0.32 + 13.12 = 13.44 ha lost since the last monitoring report (NPWS, 2019) represents a 0.50% loss of 1330 habitat, based on the total area of 1330 reported in section 5.2. In the previous reporting period (2013-2018) 5.15 ha had been lost (0.4% of the surveyed area). Overall, the short term trend is *decreasing,* with losses less than 1% of the FRA per year. The long-term trend in Area was also deemed to be *decreasing*, with no change in direction of the trend noted since the last two reporting periods. The 10x10 km grid cell distribution of 1330 increased from 202 grid cells in the previous monitoring period, to 205 grid cells in the current monitoring period. This does not represent genuine increase, being due to more accurate mapping and extensive surveying, and it masks some genuine losses of 1330 to anthropogenic activities, as noted above.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***19.33 km²***
		Maximum	***19.33 km²***
	b) Area in not-good condition	**Minimum**	***7.66 km²***
		Maximum	***7.66 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as that used in the last reporting period (NPWS, 2019). Where sites surveyed in 2017-18 were previously surveyed by McCorry (2007) and McCorry & Ryle (2009), where possible, plots were repeated in the same locations. New plot locations were chosen where it was not possible to repeat an existing plot and at sites not previously surveyed. Plots measured 2 m x 2 m and all species within the plots were recorded. The species listed below were assessed as part of the site assessment criteria. For further details, see Brophy *et al*. (2019). The typical species used in assessing the 1330 habitat are: *Agrostis stolonifera, Armeria maritima, Aster tripolium, Atriplex littoralis, Atriplex portulacoides, Atriplex prostrata, Beta vulgaris, Carex extensa, Cochlearia* spp*. (Cochlearia anglica* and *Cochlearia officinalis), Elytrigia atherica, Elytrigia repens, Festuca rubra, Glaux maritima, Juncus gerardii, Limonium humile, Plantago maritima, Puccinellia maritima, Salicornia* agg.*, Spergularia marina, Spergularia media, Suaeda maritima, Triglochin maritimum, Tripleurospermum maritimum.*
6.8 Additional information *Optional*	During the current reporting period, 13.95 km^2 of 1330, distributed across 41 sites, encompassing 91 subsites which were individually assessed, were assessed for Structure and functions. The assessed area represents 51.7% of the total area of 1330 habitat recorded in Ireland. This is a significant proportion, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. Of the total area assessed for Structure and functions in this reporting period, 71.62% (9.99 km^2) of the area was assessed as *Favourable* and 28.38% (3.96 km^2) was assessed as *Unfavourable*. Given that the assessed area represents a significant proportion of the 1330 recorded in Ireland, these percentages can be applied to the total area of the habitat to give 19.33 km^2 in good condition, and 7.66 km^2 not in good condition. The fact that less than 75% of the habitat is in good condition equates to an assessment of *Unfavourable-Bad* for Structure and functions. The approach used to estimate the percentage of the 1330 habitat in *Unfavourable* condition at each subsite is as follows: If none of the assessment criteria failed at the subsite level, the whole area of 1330 in the subsite was assessed as *Favourable*. If one or two criteria failed at the subsite level, the 1330 habitat was assessed as *Unfavourable-Inadequate* and between 10% and 25% was considered

	to be in poor condition, unless clear indications of poor conditions were more widespread. If three or more criteria failed, the 1330 at the subsite was classified as *Unfavourable-Bad* and 75-100% of the habitat was considered to be in poor condition. The exact value was determined based on the area that met the criteria of the habitat assessment. The two most frequent criteria to fail were 'Negative indicator species (cover of *Spartina* spp.)' and 'Typical species (habitat level)', which failed at 36.0% and 33.0% of assessed subsites overall. During the last reporting period, 76.7% of the 1330 habitat was assessed as *Favourable* (NPWS, 2019), and during the previous assessment, 74-94% of the habitat was in good condition. Because the percentage of 1330 habitat assessed as *Favourable* in the current reporting period (71.6%) is less than both these figures, and because encroachment of *Spartina* spp. appears to be a worsening issue, the short-term trend of habitat area in good condition must be assessed as *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
Pressures listed below were ranked on the basis of frequency, severity of influence, and area affected. Not all pressures recorded have been listed, e.g. if they affected a small area or were only recorded at one or two locations.			
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	High
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Medium
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low

PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
The pressures below are infrequent but were recorded as high impact where they occurred			
PG09 Management of fishing stocks and game	Ongoing and likely to be in the future	Minority <50%	High
PK05 Mixed source soil pollution and solid waste (excluding discharges)	Ongoing and likely to be in the future	Minority <50%	High
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	High
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Spartina* spp.; *Hippophae rhamnoides=Eleagnus rhamnoides (R18921);* *Rosa rugosa (R13131);* *Phormium tenax (R11370);* *Crocosmia* x *crocosmiiflora= Crocosmia crocosmiiflora (R04400);* *Acer pseudoplatanus (R00120);* *Cortaderia selloana (R04105)*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	Pressures and threats in section 7.1 were selected and ranked based on a combination of frequency of occurrence, intensity (high, medium or low), and area of impact, using the data gathered during the 2021-23 coastal surveys (see 7.3 for sources). In addition, all pressures presented in NPWS (2019) were considered for the current reporting period. Of the six high or medium-ranked pressures in NPWS (2019), five were retained as high or medium ranking for the current monitoring period:

	PA07 (formerly coded as A09), PF05 (formerly F07), PA25 (formerly A36), PF15 (formerly F08) and PI02 (formerly I02). The sixth pressure recorded in 2019, A33, which crosswalks to PA21 'Active abstraction of water for agriculture', was not recorded this monitoring period; instead, surveyors recorded PA22 'Drainage for use as agricultural land', which includes drainage of wetlands for agriculture. PI02 'Other invasive alien species' relates mainly to *Spartina* spp. invasion, which was recorded at 49 subsites, most of these in the southern half of the country. This is listed as the top pressure as it affects large areas, affecting both area and structure and functions, and its influence was deemed by surveyors to be high in almost all cases. PA07 'Intensive grazing or overgrazing by livestock' usually took the form of trampling and poaching of saltmarsh habitat. PF15 'Modification of coastline, estuary and coastal conditions for built-up areas' related to recent structural alterations. Coastal defences pre-designation or long-standing post-designation defences were excluded from this analysis. A number of instances of damage caused by roads, paths, railroads and related infrastructure (PE01) was recorded. While these were relatively infrequent, most of the damage caused was irreversible, so this pressure was regarded as high influence. PA08 'Extensive grazing or undergrazing by livestock' was recorded 16 times, mostly in the east/south-east of the country. This pressure affects vegetation structure. However, its influence was deemed to be low overall. PA25 'Agriculture activities not referred to above' generally related to agricultural vehicle tracks in saltmarsh causing disturbance and promotion of bare soil. A number of pressures relating to rubbish and pollution from a range of activities were recorded. The specific codes recorded were PA17 'Agricultural activities generating pollution to surface or ground waters (including marine)', PF06 'Deposition and treatment of waste/rubbish from built-up areas', PK05 'Mixed source soil pollution and solid waste (excluding discharges)' and PF07 'Residential and commercial activities and structures generating pollution to surface or ground waters'. One instance of PA19 'Agricultural activities generating soil pollution', not listed in section 7.1, was also recorded. PF05 'Sports, tourism and leisure activities' was a frequent pressure recorded, mainly in relation to trampling due to walking and habitat damage from off-road driving. Although frequent, the overall influence was deemed to be low. Two pressures have been listed in section 7.1 that were recorded at a low frequency but their influence was particularly high: one instance of PG09 'Management of fishing stocks and game' was recorded in the west and relates to large areas of saltmarsh zones being managed and dredged to provide habitat for ducks and game birds. This affected 16 ha of saltmarsh habitat. The other, PA01 'Conversion into agricultural

	land (excluding drainage and burning)' was only recorded at two sites but in both cases irreversible habitat loss was caused. PM07 'Natural processes without direct or indirect influence from human activities or climate change' was one of the most recorded pressures, generally in the form of succession to other habitats, particularly swamp. As this is deemed to be a natural process that cannot directly be controlled by conservation measures, it has not been listed in 7.1. It remains to be confirmed, however, if this succession is indeed independent of climate change or human activities. As in NPWS (2019), climate change has not been added as an impact of medium or high importance for 1330 habitat, but it is likely to affect its range over the coming decades. The long-term trend will see an increase in mean sea level and extreme weather events (Desmond *et al*., 2017), which will impact the formation, stabilisation and vegetation communities of the 1330 habitat. In particular, there may be a higher incidence of succession to non-Annex habitats such as swamp. Furthermore, climate change may have unanticipated impacts on the physiology of invasive species such as *Spartina* and *Hippophae rhamnoides.*

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	*Active measures:* MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MF02 Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities *Additional measures not currently active but recommended more than once during the current reporting period (listed in descending order of frequency):* MI03 Management, control or eradication of other invasive alien species MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MF07 Reduce/eliminate pollution (incl. noise, light, heat, soil pollution) from industrial, commercial, residential and recreational areas and activities MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	Two managed realignment projects were identified in the course of the SAMFHIRES project (NPWS, 2019) and are still in place: one at Turvey, Rogerstown Estuary, Co. Dublin, within the Rogerstown Estuary SAC (site code 000208), recorded as CA15 in NPWS (2019), now recorded as MA13; and the other at Kilmacleague, Tramore, Co. Waterford, outside but adjacent to the Tramore Dunes and Backstrand SAC (site code 000671), recorded as CF02 in NPWS (2019)

	but now recorded as MF02. The measures are detailed in full in NPWS (2019). Saltmarsh habitats were not targeted by any of the actions listed for the GLAS agri-environment scheme (Image and Forster Brown, 2018), but saltmarsh habitats are recognised in the ACRES Co-operative (CP) scheme in the scorecard for 'coastal grassland habitats', which includes dunes, machair and saltmarsh. Positive indicator species include saltmarsh species such as Sea Lavender, Sea Milkwort, Sea Plantain and Buck's-horn Plantain. Vegetation structure is assessed based on sward height diversity. The scorecard includes an assessment of risks to habitat, vegetation, soil and water bodies within, adjacent to and downstream of the field being assessed from pressures relating to flow, sediment, nutrients or other pollutants. Artificial drainage is also scored. Payments are results-based, i.e. linked to scorecard results, thus incentivising landowners to lessen or eliminate negatively scoring issues such as pollution or habitat damage, so as to qualify for higher payments. The measures employed by landowners to address issues noted on ACRES CP scorecards may be varied and could fall under a number of different conservation measure codes. For the purposes of this report, the two most appropriate codes, which should cover the majority of cases, are deemed to be MA05 and MA10. Apart from the ACRES measures above, existing conservation measures were identified at one site surveyed in the course of the current reporting period (NPWS, in prep.). Study exclusion areas were observed at site 13, subsite 2 (NPWS, in prep.) and recorded under measure MA05. However, the issue of disturbance of sediment due to poaching by grazing animals remains to be addressed. Grazing exclosures have been in place in Sheskinmore, Co. Donegal and Ballyteige Burrow, Co. Wexford, since 2014 as part of a study set up for the SAMFHIRES project (Perrin *et al.*, 2020). Their purpose is for research rather than conservation at this time, but the results of the study may help to inform optimal grazing levels on 1330 habitat at both locations, and elsewhere, in the future. All other measures listed in 8.6 are recommended, mostly to improve the structure and functions of the habitat, but they are not yet being implemented. MI03 'Management, control or eradication of other invasive alien species' could be considered for *Spartina* spp. but given the complexity of the issue this would need to be subject to a comprehensive assessment. This is no doubt the reason for the exclusion of *Spartina* spp. from the ACRES CP invasive species assessment. As noted in NPWS (2019), from a long-term standpoint, MJ02 'Implement climate change adaptation measures' (recorded in 2019 as CN02) is likely to be required to address the issue of climate change. Sea level rise will impact negatively on 1330 area (Horton *et al.*, 2018) and measures such as managed retreat may be required to maintain 1330 area and structure and functions.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the pressures and threats that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*, as NPWS (2019) reported a loss in area of 0.4% due to anthropogenic impacts during the last reporting period, while for the current reporting period a loss of 0.74% of the total surveyed area was recorded. Current area is <10% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures and increase the habitat area to the FRA. Future prospects of Area are therefore *Poor*. The percentage of 1330 habitat in good condition is 71.62% and the percentage not in good condition is 28.38%. More than 25% of the habitat not in good condition corresponds to an *Unfavourable-Bad* assessment. The conservation status of Structure and functions is therefore *Unfavourable-Bad*. The current Structure and functions assessment of 71.62% of 1330 habitat in good condition is down from 77% in the last reporting period. The short-term trend direction of Structure and functions is therefore *decreasing* for habitat that is in good condition. Taking the listed pressures, threats and conservation measures into account, the future trend of Structure and functions is assessed as *stable*, with little overall change expected in Structure and functions over the next two reporting periods. As the current conservation status of Structure and functions is *Unfavourable-Bad*, the Future prospects of Structure and functions are also assessed as *Bad*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*

<table>
<tr><td>10.4 Future prospects</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="9">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td>a) No, there is no difference</td><td><u>a) No, there is no difference</u></td></tr>
<tr><td><u>b) yes, due to genuine change</u></td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is Favourable in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area is Unfavourable-Inadequate, which is unchanged since the previous reporting period. Loss of habitat continues to occur due to a range of pressures and activities, including Spartina invasion and conversion of saltmarsh to other land-use types.

The Conservation Status of Structure and functions and Future prospects were assessed as Unfavourable-Bad during this reporting period, a deterioration from Unfavourable-Inadequate in the previous reporting period.

The Overall Conservation Status was assessed as Unfavourable-Bad, a deterioration from Unfavourable-Inadequate during the last reporting period. The assessment of Unfavourable-Bad during the current reporting period is due to the current area being below the Favourable Reference Area and the area of the habitat decreasing, as well as Structure and functions and Future prospects deteriorating further to Unfavourable-Bad. The two most frequent criteria to fail the Structure and functions assessment were ‘Negative indicator species (cover of Spartina spp.)’ and ‘Typical species (habitat level)’, which failed at 36.0% and 33.0% of assessed subsites overall. Spartina invasion was</td></tr>
</table>

	also the most frequent pressure recorded. From the results of the 2021-23 surveys, *Spartina* would seem to be the main issue affecting 1330 habitat at present. However, the issue is a complex one and extremely difficult to tackle. More research on the ecological impacts of *Spartina* on native saltmarsh species is required. Future assessments of 1330 habitat may take a more relaxed approach to the presence of *Spartina* when assessing the conservation status of Irish saltmarshes. For this reporting period, however, *Spartina* is still regarded as a serious negative impact on Irish saltmarsh ecosystems.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***23.36 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	

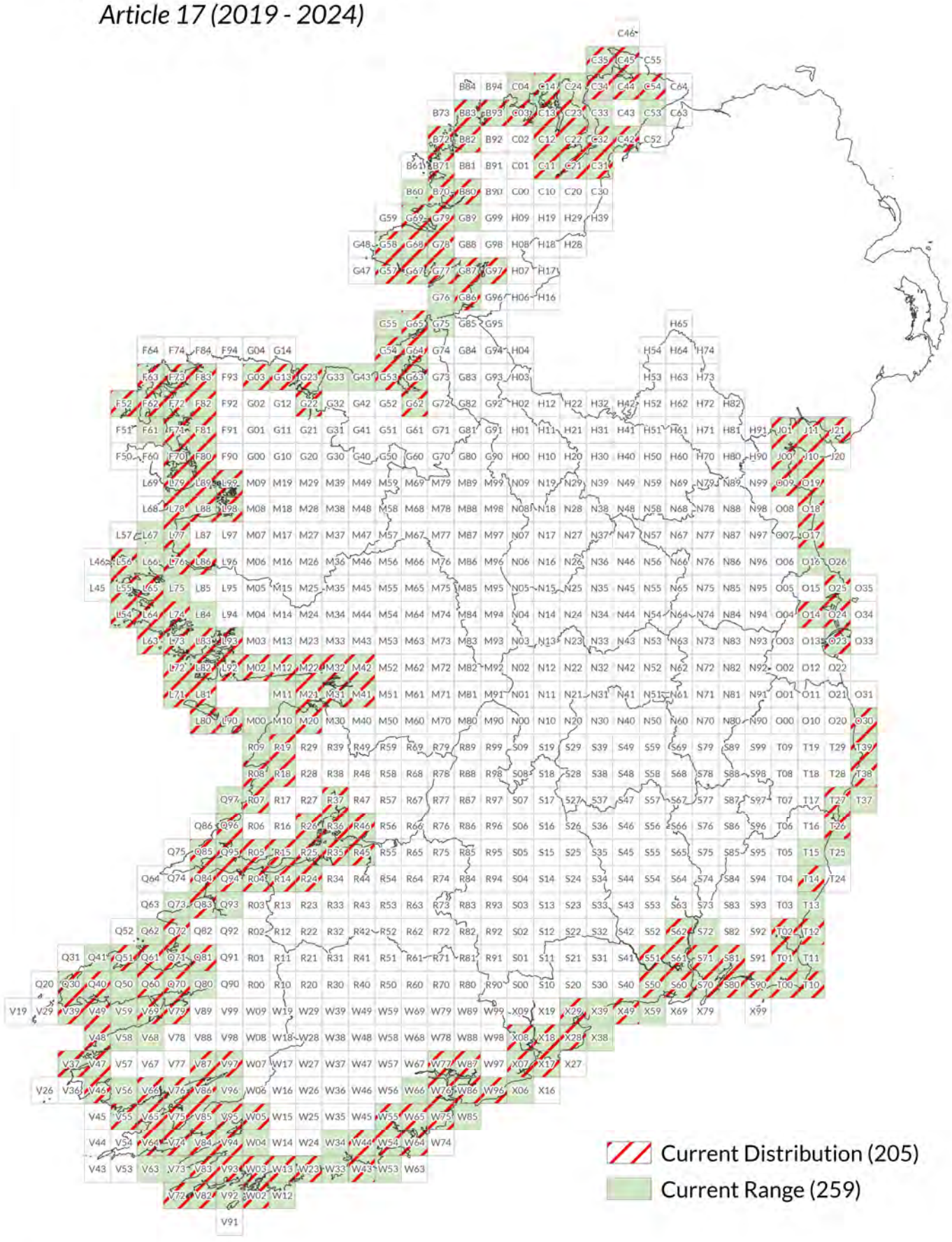
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile. The area given in section 11.1 is the total area of 1330 habitat in SACs in the country, including some SACs where 1330 is not listed as a qualifying interest (QI). The area of 1330 within the SAC network where it is listed as a QI is 20.53 km^2. In the previous reporting period (2013-2018), over half of the 1330 habitat lost due to anthropogenic activities was from within SACs, all but two of which listed 1330 as a QI (NPWS, 2019). In the current reporting period, a total of 13.18 ha of 1330 was reported as lost from within SACs where 1330 is a QI. A further 0.07 ha were lost from an SAC where 1330 is not a QI. The remaining 0.18 ha of loss occurred outside of the SAC network. These losses were reported from across eight SACs, seven of them listing 1330 as a QI. *Spartina* caused losses in six SACs where 1330 is a QI. Of these six, one was additionally impacted by construction, and another by conversion to agriculture, although the area impacted by this was minor and largely caused by a slight overlap between the SAC boundary and the adjacent field. A rock embankment was the reason for loss in the SAC which did not list 1330 as a QI. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 1330 habitat nationally (see section 6.4 and 6.8), as the majority of 1330 habitat surveyed during the last two reporting periods was within the SAC network. A further check was carried out on two subsets of sites assessed in this monitoring period, with one subset containing sites that overlapped more than 90% with an SAC, and the other subset containing sites that overlapped less than 12% with an SAC. The average percentage of 1330 habitat in good condition was 69.3% in sites that were at least 90% within an SAC. This contrasted with an average percentage of 56.0% in good condition for sites that lay almost totally outside of an SAC. Thus, the proportion of habitat in good condition in the SAC network is higher than those outside of the SAC network, although it is still lower than the corresponding figure reported for the previous reporting period in NPWS (2019). The surface area of 1330 habitat within the SAC network has decreased slightly from the previous reporting period; this is in part due to genuine change, mainly due to losses caused by *Spartina*, but may also be due to a change in methodology, in particular in relation to how *Spartina* losses are mapped. As noted earlier in this section, area changes due to *Spartina* expansion have accounted for the majority of the losses in 1330 area mapped in this monitoring period,

	although other small anthropogenic changes have also occurred (see also section 7).

12 Complementary information *N/A*

Atlantic salt meadows (1330)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1410 Mediterranean salt meadows (*Juncetalia maritimi*)**
1.2i Habitat short name	**Mediterranean salt meadows**
1.3i Habitat description	Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. They are widespread on the Irish coastline; however, they are not as extensive as Atlantic salt meadows (1330). The habitat is distinguished from Atlantic salt meadows by the presence of rushes such as Sea Rush (*Juncus maritimus*) and/or Sharp Rush (*Juncus acutus*), along with a range of species typically found in Atlantic salt meadows, including Sea Aster (*Aster tripolium*), Sea Purslane (*Atriplex portulacoides*), Sea-milkwort (*Glaux maritima*), Saltmarsh Rush (*Juncus gerardii*), Parsley Water-dropwort (*Oenanthe lachenalii*), Sea plantain (*Plantago maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*). Mediterranean salt meadows can comprise plant communities SM5A Juncus maritimus-Festuca rubra saltmarsh and SM5B Juncus maritimus-Plantago maritima saltmarsh in the Irish Vegetation Classification (IVC) (Perrin, 2024).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1982-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was mainly compiled from polygons mapped as containing 1410 habitat in surveyed carried out between 2021 and 2023 (Gallagher *et al*., in prep.; Rigoni *et al*., in prep.; NPWS, in prep.). These polygons overlap many of those mapped by surveys that took place in previous reporting periods and therefore supersede them. However, some polygons from Perrin *et al*. (2020), Brophy *et al*. (2019) and McCorry & Ryle (2009) that were not revisited during the 2021-23 surveys remain in the dataset. They are assumed still to be 1410 habitat, in the absence of definitive evidence to the contrary.

	Point data were also used to contribute to the 10x10 km grid cell range and distribution maps. These points were from plots, dating from 1982 onwards, from the National Vegetation Database that were identified as IVC communities that correspond to 1410 habitat (Perrin, 2024). In addition, 10x10 km grid cell records of *Juncus maritimus* or *Juncus acutus* from the latest BSBI Atlas of British and Irish flora (Stroh *et al*., 2022) were included following methodology used in both the 2007-2012 and 2013-2018 reporting periods (NPWS, 2013, 2019). It should be noted that the current habitat distribution mapping methodology for 1410 is under review and is likely to be updated over the next reporting period. This may result in changes to the habitat range and distribution in future reporting cycles. All references and sources are detailed in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 is the lowest. The new data sources added since the last round of reporting (NPWS, 2019), as well as Brophy *et al.* (2019) and Perrin (2018), were judged to be a high certainty of 3. Saltmarsh Monitoring Project (SMP) datasets (McCorry, 2007; McCorry & Ryle, 2009) were also both assigned a certainty of 3. These two datasets were based on a detailed field survey and a high certainty of 3 is justified due to the generally stable nature of 1410 and based on the re-survey of a significant proportion of these areas conducted by Brophy *et al.* (2019). Saltmarsh habitat identified via a desk study and aerial photograph analysis as part of the SMP was included in the SMP GIS shapefile. Where the areas identified during the desktop study were not visited by subsequent field surveys, they were assigned a certainty of 2. This is based on experience visiting desk study polygons, where saltmarsh was often present, but on occasion there was no saltmarsh, or the type of saltmarsh was incorrectly identified. Point data derived from analysis of plots from the National Vegetation Database, and included in the distribution, cover a date range of 1982-2009. Plots from 2001-2009 (which included the SMP plots) were assigned a certainty of 3, while earlier data (1982-2000) were assigned a certainty of 2. All data with certainty 2 or 3 were used to map the distribution for the 1330 habitat. A comparison between distribution from the previous reporting round (NPWS, 2019) and the current round revealed that a total of three 10x10 km grid cells in the 2019 distribution were deleted, and 21 cells were added. This resulted in the distribution increasing from 184 cells to 202. All of these changes were brought about by changes in the reported distribution of *Juncus maritimus/acutus*. This is not thought to represent a genuine change in the distribution between reporting periods, but rather reflects better and more recent data, including updated mapping of *Juncus maritimus* and *J. acutus* by the BSBI Atlas 2020 project.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Brophy, J.T., Perrin, P.M., Penk, M.R., Devaney, F.M. & Leyden, K.J. (2019) Saltmarsh Monitoring Project 2017-2018. *Irish Wildlife Manuals*, No. 108. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. Curtis, T.G.F. & Sheehy Skeffington, M. (1998) The saltmarshes of Ireland: an inventory and account of their geographical variation. *Biology and Environment, Proceedings of the Royal Irish Academy,* 98B, 87-104. Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. EPA, Wexford. Devaney, F.M. & Perrin, P.M. (2015) Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE). End of Project Report. Prepared for the Environmental Protection Agency by BEC Consultants Ltd. 2013-W-DS-10. Gallagher, M.C. & Crushell, P. (in prep.). Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin Horton, B.P., Shennan, I., Bradley, S.L., Cahill, N., Kirwan, M., Kopp, R.E. & Shaw, T.A. (2018) Predicting marsh vulnerability to sea-level rise using Holocene relative sea-level data. *Nature Communications,* 9, 2687-2690. Image, M. & Forster Brown, C. (2018) Baseline Analysis of Actions under GLAS: Full Report. Report for the Department of Agriculture, Food and the Marine. JNCC (2004) Common Standards Monitoring Guidance for saltmarsh habitat. Joint Nature Conservation Committee, Peterborough. McCorry, M. (2007) Saltmarsh Monitoring Project 2006 – Summary Report. Unpublished report for the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. McCorry, M.J. & Ryle, T. (2009) Saltmarsh Monitoring Project 2007-2008: Final report. Unpublished report for the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

National Vegetation Database. National Biodiversity Data Centre. Available at http://www.biodiversityireland.ie/projects/national-vegetation-database/

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.

NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Perrin, P. (2016) Irish Vegetation Classification Technical Progress Report No. 2. Unpublished report by BEC Consultants for the National Biodiversity Data Centre. http://www.biodiversity ireland.ie/wordpress/wp-content/uploads/IVC_Technical-Progress-Report-No.2.pdf. 34pp.

Perrin, P.M. (2018) SAMFHIRES (Saltmarsh Function and Human Impacts in Relation to Ecological Status) unpublished field survey data. EPA-Funded collaboration between BEC Consultants Ltd and Trinity College Dublin.

Perrin, P.M. (2024) Handbook for the Irish Vegetation Classification. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024. http://www.biodiversity ireland.ie/projects/national-vegetation-database/irish-vegetation-classification/ on 28/09/2018.

Preston, C.D., Pearman, D. & Dines, T.D. (2002) *New Atlas of the British & Irish Flora: An Atlas of the Vascular Plants of Britain, Ireland, the Isle of Man and the Channel Islands, Volume 1.* Oxford University Press, UK. 910pp.

Rigoni, P., Lupieri, G., Rodi E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal Monitoring Project. A report to the National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Stroh, P. A., Walker, K.J., Humphrey, T.A., Pescott, O.L. & Burkmar, R.J. (2023) *Plant Atlas 2020: Mapping Changes in the Distribution of the British and Irish Flora.* 2 Volumes. Princeton: Princeton University Press.

Wymer, E.D. (1984) The phytosociology of Irish saltmarsh vegetation. M.Sc. Thesis, National University of Ireland, Dublin.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***25,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 25,800 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 1410 habitat. The method for determining the current known distribution is detailed in section 5 (Area) below. Briefly, the distribution was determined using data from surveys carried out between 2021 and 2023 (Rigoni et al., in prep.; Gallagher et al., in prep.; NPWS, in prep.), relevés held in the National Vegetation Database (NVD) corresponding to IVC communities for 1410 habitat (Perrin, 2024), and 10x10 km grid cells in which two key species in 1410 habitat, Juncus maritimus and Juncus acutus, had been recorded for the BSBI Atlas of the British and Irish flora between 2000 and 2019 (Stroh et al. 2023). This was an updated data source for these species’</td></tr>
</table>

	records, superseding Preston *et al*. (2002), the reference used in NPWS (2019). The NVD relevés did not add any 10x10 km grid cells additional to those included because of mapped 1410 habitat. However, an additional 42 grid cells were added on the basis of the *Juncus* spp. records. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Thirty-two grid cells generated by the range tool that had no coastline or suitable estuarine habitat were removed, as follows: B92, C02/43, F90/92/93, G12/88, L85/87/97, M03, O15, Q82, R06/17/27/28/34, S91, T03/28, V57/67/77/78/88, W06/14/97/98, X19. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the area losses recorded during these two reporting periods led to a contraction in the range. The number of 10x10 km grid cells in the range (258) is 20 grid cells higher than the last monitoring period (NPWS, 2019). This change is due to the use of updated distribution data for *Juncus maritimus* and *Juncus acutus* from Stroh *et al*. (2023), rather than to actual increases in the habitat area outside of the previous range. Twenty-two of the 10x10 km grid squares in the 2025 distribution owe their inclusion solely to the presence of *Juncus maritimus* or *Juncus acutus*, with consequent effects on the grid cells included in the range. Therefore, despite the increase, the short-term trend in Range is assessed as *stable*. Two 10x10 km grid cells that were included in the 2019 range were not in the 2025 range, but this is not because of habitat loss. S19 was removed from the range in 2025 as it does not contain any coastal habitat (its inclusion in 2019 may have been in error); and W85 was included in the 2019 range on the basis of a record for *Juncus maritimus* in W75 which was not recorded in the latest Atlas of Flora (Stroh *et al*., 2022). There are insufficient data to determine whether or not the absence of *Juncus maritimus* from W75 represents loss of 1410 habitat. W85 was included in the 2019 range on the basis of W75 being in the distribution but is no longer included in the 2025 range. The current range encompasses all significant ecological variations of this habitat. As the Favourable Reference Range (FRR) is taken to be the current range, the FRR has increased from the 23,800 km^2 reported in the 2013-2018 reporting period (NPWS, 2019).

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2006-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***9.72 km^2***

5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***2.8%***
	b) Estimated Maximum	***2.8%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ ***between 2% and 10% smaller than the FRA*** ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 2006 (McCorry, 2007) when the pilot baseline survey was carried out, and incorporates updates made by McCorry & Ryle (2009), Perrin (2018), Brophy *et al*. (2019) and coastal surveys carried out between 2021 and 2013 (Rigoni *et al*., in prep.; Gallagher *et al*., in prep.; NPWS, in prep.). For this reporting period, data from the Coastal Monitoring Project (CMP) 2004-2005 (Ryle *et al*., 2009) that pre-dated desktop saltmarsh	

	determinations made during McCorry & Ryle's saltmarsh project, and which had not been available at the time the desktop determinations were being made, were used in preference to the desktop data. For example, if an in-person CMP survey determined an area as sand dune habitat in 2005 and desktop surveys determined it as 1410 in 2007, the in-person survey data were used as they were deemed to be more reliable. Note that this is a different methodology from that used in the previous reporting period, when CMP data were not used, and some of the area differences between this reporting period and the last are due to this. There are still areas of unmapped 1410 habitat in the country, mostly in the form of narrow fringes along the shoreline in places. Some such areas were recorded during the 2017-18 and 2021-2023 surveys; however, all significant saltmarsh areas have now been covered by the surveys listed above, either via field survey or desk study. Favourable Reference Area (FRA) was not determined exactly but is assumed to be equal to the area when the Directive came into force, which is assumed to be the minimum required for the long-term viability of the habitat. FRA is estimated to be <10% more than the current area, as determined in the previous reporting period (NPWS, 2019). FRA is deemed to be greater than the current area, given that some anthropogenic losses have occurred since the Directive came into force and there have also been losses due to natural processes. During the 2021-2023 coastal habitat surveys, 141 subsites containing 1410 were assessed for Area. These subsites represent 4.42 km^2 (45.5%) of the total area of 1410 habitat recorded in Ireland. This represents a significant proportion of the total area of 1410, covering all coasts, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. A small increase in area was recorded between the previous and current reporting periods (9.64 km^2 and 9.72 km^2 respectively), amounting to 0.08 km^2 (8 ha) but this is deemed to be due to a combination of local increases and decreases due to succession, more accurate data due to improved aerial imagery, additional areas surveyed and mapped, and surveyor variability. However, short-term trend in Area was deemed to be *decreasing*, as this statistic examines area changes that have taken place over the last two reporting periods. Anthropogenic losses were recorded in the previous monitoring period that are not balanced out by any increases in the current period. The decrease from 10.00 km^2 (2007-2012 reporting period; NPWS, 2013) to 9.72 km^2 (current reporting period) represents a 2.8% decrease in area since 2012. The long-term trend in Area was deemed to be *decreasing* based on the fact that anthropogenic losses of 1410 habitat have been recorded in the three monitoring periods before the current (i.e., since the 2001-2006 monitoring period), with insufficient 1410 habitat area restored to compensate for these losses.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***8.42 km²***
		Maximum	***8.42 km²***
	b) Area in not-good condition	**Minimum**	***1.29 km²***
		Maximum	***1.29 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***		
6.7 Typical species Method used *Optional*	The list of typical species is the same as that used in the last reporting period (NPWS, 2019). Where sites surveyed in 2017-18 were previously surveyed by McCorry (2007) and McCorry & Ryle (2009), plots were repeated in the same locations, where possible. New plot locations were chosen where it was not possible to repeat an existing plot and at sites not previously surveyed. Plots measured 2 m x 2 m and all species within the plots were recorded. The species listed below were assessed as part of the site assessment criteria. The methodology described in Brophy *et al*. (2019) was used for the 2021-2023 surveys. The typical species used in assessing the 1410 habitat are: *Aster tripolium*, *Cochlearia* spp. (*Cochlearia anglica* and *Cochlearia officinalis*), *Glaux maritima*, *Juncus acutus*, *Juncus maritimus*, *Juncus gerardii*, *Leontodon autumnalis*, *Oenanthe lachenalii*, *Plantago maritima*, *Triglochin maritimum*.		

6.8 Additional information *Optional*	During the current reporting period, 83 subsites containing 1410 were visited between 2021 and 2023 by the coastal survey teams and 74 subsites had sufficient area of the habitat to assessed for Structure and functions. These 74 subsites contain 4.40 km^2 (45.3%) of the total area of 1410 habitat recorded in Ireland. This represents a significant proportion of the total area of 1410, covering all coasts, and therefore it is considered that the conclusions drawn for the surveyed areas can be applied to the country as a whole. The approach used to estimate the percentage of the 1410 habitat in unfavourable (not good) condition at each site was as follows: If none of the assessment criteria failed at the site level then 90-100% of the 1410 area was classified as being in good condition; if any criteria failed, then over 10% of the habitat was considered to be in unfavourable condition. Generally speaking, where one to two criteria failed at the site level, less than 25% of the 1410 area was considered to be in unfavourable condition. Where three or more assessment criteria failed, more than 25% of the 1410 area at the site was generally considered to be in unfavourable condition. The most frequent criterion to fail was 'Disturbed ground (stop level)', which reflects the fact that 1410 was often intensively grazed. During the 2007-2012 reporting period, 85-98% of the 1410 habitat was assessed as *Favourable* (NPWS, 2013), and during the 2013-2018 reporting period, the percentage of 1410 habitat assessed as *Favourable* was 91%, falling in the centre of the previously reported range. Of the 74 subsites assessed for Structure and functions in the current reporting period, 86.6% of the area was assessed as good (*Favourable* condition), slightly lower than the percentage in good condition reported in NPWS (2019) and within – but on the lower end of – the range reported in NPWS (2013). When extrapolated up to the total area of the habitat in Ireland, the area in good condition is estimated to be 8.42 km^2, slightly lower than the figure of 8.77 km^2 reported in NPWS (2019).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
The pressures listed below were ranked on the basis of frequency, severity of influence, and area affected. Not all pressures recorded have been listed, e.g. if they affected a small area or were only recorded at one or two locations. Impacts listed as having high and medium influence were widespread and were recorded as having primarily high or medium intensity where they occurred. Impacts listed as low influence were either widely recorded and of low intensity or were very infrequent but had a significant effect on habitat quality where they occurred.			

PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing/future	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing/future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing/future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing/future	Minority <50%	Medium
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing/future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing/future	Minority <50%	High
PL06 Physical alteration of water bodies (mixed or unknown drivers)	Ongoing/future	Minority <50%	Low
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing	Minority <50%	Medium
PG09 Management of fishing stocks and game	Ongoing/future	Minority <50%	Low
e) Invasive alien species of Union concern	N/A		
f) Other invasive alien species *Optional*	R14362 *Spartina alterniflora;* R17227 *Spartina anglica;* R18921 *Elaeagnus rhamnoides (=Hippophae rhamnoides);* R12976 *Rhododendron ponticum;* R13131 *Rosa rugosa*		
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
7.3 Sources of information *Optional*	Pressures and threats were selected and ranked from the following data: Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.		

	Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	Pressures and threats in section 7.1 were selected and ranked based on frequency of occurrence, area of impact and intensity (high, medium or low), using the data gathered during the 2021-23 Coastal habitat surveys. All pressures presented in NPWS (2019) were also examined for their occurrence during the current reporting period. It should be noted that 1410 habitat in 35 of the 83 sites (42%) visited by the coastal surveys of 2021-23 did not have any impact recorded. PA07 'Intensive grazing or overgrazing by livestock', recorded as a high pressure in NPWS (2019) (as A09), was again recorded as a high pressure for this reporting period, and was the most frequently recorded impact, affecting 23 of the 83 sites (28%) in which 1410 was recorded. Overgrazing was evident as poaching, trampling and short swards. The area of the sampled habitat affected by this impact was 95 ha, the second highest of all impacts recorded in 1410, after PA08 'Extensive grazing or undergrazing by livestock'. PA08 was recorded as a medium pressure in NPWS (2019) (as A10), and again as medium in the current reporting period. While its frequency was lower than PA07 (it affected 10 of the 83 sites visited, or 12%), it impacted 101 ha of 1410 habitat. The impact was evident as rank swards in which some grazing was taking place but at too low a level. Rank swards also resulted from PA05 'Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)', but in these cases no management of any kind was seen to be occurring. Seven such instances were recorded. PI02 'Other invasive alien species (other than species of Union concern)' was the most frequent impact recorded after PA07, affecting 18 of the 83 sites with 1410 (22%). The influence was judged to be high. However, the total area affected was lower than PA07, estimated at 13 ha. *Spartina* was the main taxon implicated, with isolated records of *Hippophae rhamnoides*, *Rhododendron ponticum* and *Rosa rugosa* also noted. PL06 'Physical alteration of water bodies (mixed or unknown drivers)' – essentially modification of drainage ditches and creeks in or adjacent to 1410 habitat – was also recorded in 22% of sites, but the influence of this impact was deemed to be low, due to frequent tidal inundation of the habitat. The code PL06 was used rather than PA22 'Drainage for use as agricultural land' as the principal driver for the drainage is unknown and may not be agricultural in origin. The pressure PM07 'Natural processes without direct or indirect influence from human activities or climate change' has not been included here, as area changes due to natural processes are not subject to improvement by conservation measures. It is possible, however, that natural processes such as erosion and storm surges may become more frequent and severe as a result of climate change, ultimately having a negative impact on 1410 habitat. Climate change has not been added

	as an impact, but it is likely to affect the range of 1410 over the coming decades. The long-term trend will see an increase in mean sea level and extreme weather events (Desmond *et al.*, 2017), which will impact the formation of the 1410 habitat.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)
8.7 Additional information *Optional*	The only conservation measure implemented in the current reporting period and identified at the sites surveyed in the course of the current project was MA03 'Maintain existing extensive agricultural practices and agricultural landscape features' (unpublished data from NPWS, in prep.). This was noted at two subsites in Co. Galway, within Kilkieran Bay and Islands SAC (site code 002111). Other conservation measures being implemented were reported in the previous Article 17 report (NPWS 2019). Two managed realignment projects were identified in the course of the SAMFHIRES project (P. Perrin, pers. comm.), one at Turvey, Rogerstown Estuary, Co. Dublin and the other at Kilmacleague, Tramore, Co. Waterford. At Turvey, Rogerstown Estuary, Co. Dublin, a 1.4 km long, 1.5 m high levee was removed by Fingal County Council in 2015 to allow complete access to tidal waters across an area of 24 ha (MA13). This area is part of a council nature reserve and already supported some saltmarsh vegetation due to a gap in the levee, but the removal of the levee will improve the hydrological connectivity and encourage the creation of additional saltmarsh habitat. This area is within the Rogerstown Estuary SAC (site code 000208). Saltmarsh habitat at Kilmacleague, Tramore, Co. Waterford had been lost during the construction of a landfill site. Following a European Court of Justice case (C 494/01), Ireland was required to provide compensatory habitat (MF02). A project to create 5 ha of mudflat and 2.5 ha of saltmarsh was initiated and involved the breaching of an existing embankment to allow previously enclosed agricultural land to flood through part of the tidal cycle. The project has seen the development of 1310 and 1330 habitat since the embankment was breached in 2013, and 1410 may develop later, as the habitat is recorded within the site. This site is outside, but adjacent to, the Tramore Dunes and Backstrand SAC (site code 000671). Saltmarsh habitats are not the target of any of the actions (non-productive investments) listed for the ACRES agri-environment scheme, but saltmarsh habitats are recognised in the ACRES Co-operative (CP) scheme in the scorecard for 'coastal grassland habitats', which includes dunes, machair and saltmarsh. Vegetation structure is assessed based on sward height diversity. The scorecard includes an assessment of risks to habitat, vegetation, soil and water bodies within, adjacent to and downstream of the field being assessed from pressures relating to flow, sediment, nutrients or other

	pollutants. Artificial drainage is also scored. Payments are results-based, i.e. linked to scorecard results, thus incentivising landowners to lessen or eliminate negatively scoring issues such as pollution or habitat damage, so as to qualify for higher payments. The measures employed by landowners to address issues noted on ACRES CP scorecards may be varied and could fall under a number of different conservation measure codes. For the purposes of this report, in the context of pressures reported, the most appropriate code is MA05. Conservation measures that are not currently being implemented, but whose implementation would improve the Structure and functions of the habitat, include: MI03 'Management, control or eradication of other invasive alien species' – this was the next most recommended conservation measure, recommended at 14 sites, and mainly related to control of *Spartina* spp.; MA04 'Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures' – this was recommended at seven sites; MF02 'Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities' – this was recommended at six sites; MA13 'Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)' – recommended at three sites; MA06 'Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)' – recommended at two sites. Recommended at one site each were: MA01 'Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land'; MA14 'Other measures related to agricultural practices'; MC02 'Adapt/manage exploitation of energy resources (to combat peat cutting)'; and MK02 'Reduce impact of multi-purpose hydrological changes'. From a long-term standpoint, MJ02 'Implement climate change adaptation measures' is likely to be required to address the issue of climate change. Sea level rise will impact negatively on 1410 area (Horton *et al*., 2018) and measures such as managed retreat may be required to maintain 1410 Area and Structure and functions.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** / *Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information	Short-term trend direction of Range is assessed as *stable*. Current Range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*.	

Optional	Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*, a loss of 2.8% of the total surveyed area was recorded for the current reporting period, following a loss of 3.69% for the previous reporting period. Current area is 2-10% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative* as no conservation measures have been identified to counteract the listed pressures and return the habitat to the FRA. Future prospects of Area are therefore *Poor*. Short-term trend direction of Structure and functions is *decreasing* for habitat that is in good condition. Structure and functions of 86.66% of the habitat are in good condition, which is below the 90% threshold for Favourable. Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *decreasing* due to the magnitude and nature of the pressures and insufficiency of conservation measures recorded. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*

	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Unfavourable-Inadequate* in this reporting period, as it was in the previous reporting period. The Conservation Status of Structure and functions is *Unfavourable-Inadequate* in this reporting period, while it was assessed as *Favourable* in the previous reporting period. The Conservation Status of Future prospects is *Unfavourable-Inadequate* in this reporting period, as it was in the previous reporting period. The Overall Conservation Status is assessed as *Unfavourable-Inadequate*, as it was during the last reporting period. The status of *Unfavourable-Inadequate* during the current reporting period was due to the current area being below the Favourable Reference Area, the area of the habitat decreasing, and a lower percentage of the habitat being in good condition in terms of Structure and functions. Overall trend in Conservation Status was assessed as *deteriorating*. A small increase in area was recorded between the 2013-2018 and current reporting periods (9.64 km^2 and 9.72 km^2 respectively), amounting to 0.08 km^2 (8 ha) but this is deemed to be due to a combination of local increases and decreases due to succession, more accurate data due to improved aerial imagery, additional areas surveyed and mapped, and surveyor variability. However, short-term trend in Area was deemed to be *decreasing*, as this statistic examines area changes that have taken place over the last two reporting periods. Anthropogenic losses were recorded in the previous monitoring period that are not balanced out by any increases in the current period. The decrease from 10.00 km^2 (2007-2012) to 9.64 km^2 (2013-2018) to 9.72 km^2 (2019-2024) represents a 2.8% decrease in area since 2012. In NPWS (2013), the Overall trend in Conservation Status was assessed as *stable*, as a loss in area, representing 0.07% of the surveyed area, was not deemed significant for the future trend in Area. Based on the increase in the rate of loss in the 2013-2018 reporting period (NPWS, 2019), and in light of the fact that loss of area has continued into the current period (2019-2024), the level of anthropogenic loss is considered significant and therefore the Overall trend in Conservation Status is assessed as *deteriorating*.	

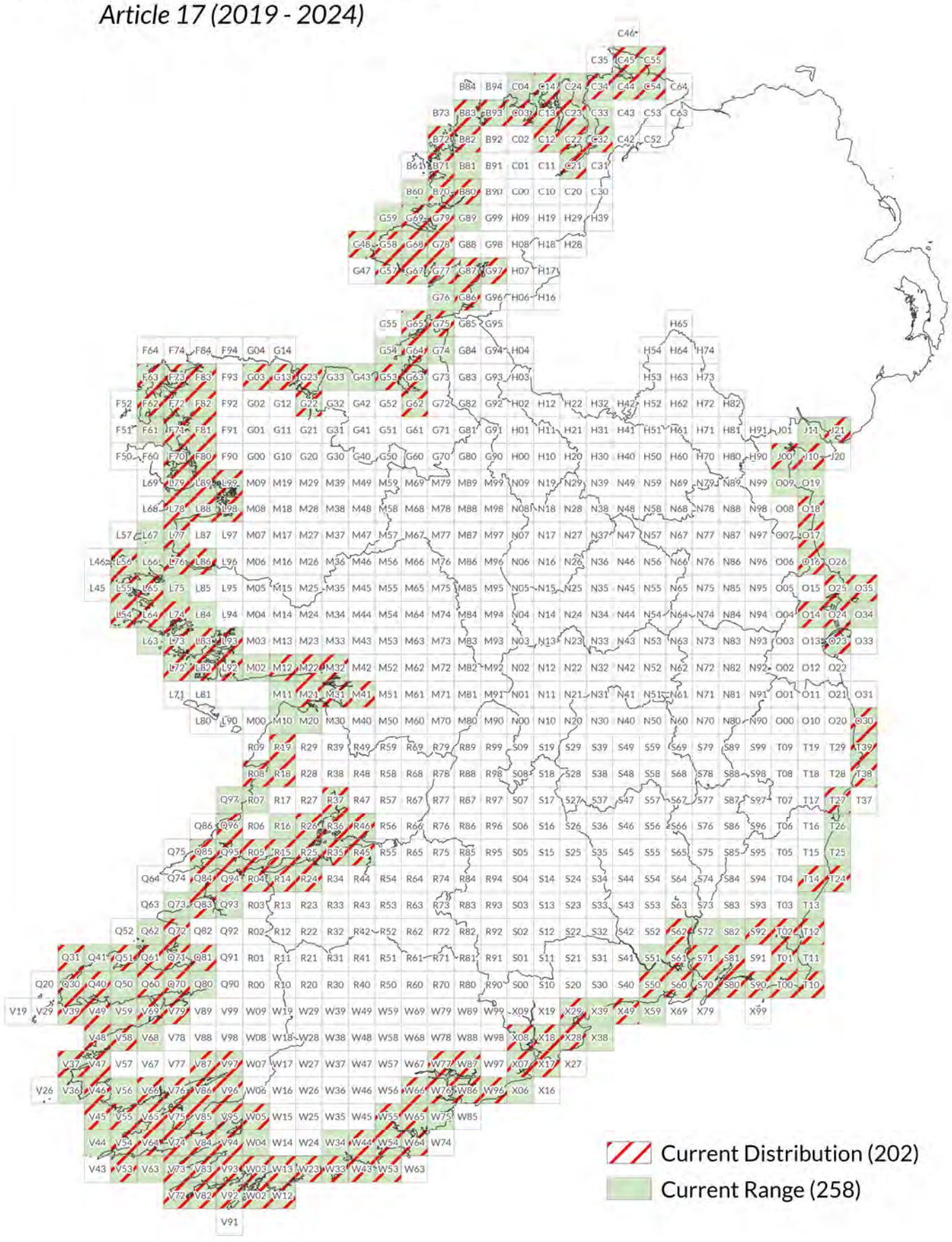
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***7.58 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile. The area given in section 11.1 is the total area of 1410 habitat in SACs in the country, including some SACs where 1410 is not listed as a qualifying interest (QI). The area of 1410 within the Natura 2000 network where it is listed as a QI is 6.27 km^2. This is higher than in the previous reporting period owing to minor mapping differences and	

	the addition of 1410 as a QI to Slieve Tooey/Tormore Island/Loughros Beg Bay SAC (site code 000190). In contrast to the previous reporting period (2013-2018), in which 90% of the 15.46 ha of the 1410 habitat lost due to anthropogenic impacts was from within SACs, there were no significant anthropogenic losses in 1410 noted in this monitoring period, although there were changes due to natural processes such as succession, mainly to 1330 Atlantic salt marsh or swamp. Some losses due to *Spartina* were also recorded, but estimates of area loss attributable to this impact are difficult to make with a high degree of accuracy due to between-observer variability in estimating percent covers by eye, particularly in situations where the invasive plant is scattered throughout the habitat. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 1410 habitat nationally (see section 6.4 and 6.8), as the majority of 1410 habitat surveyed during the last two reporting periods was within the SAC network.

12 Complementary information *N/A*

Mediterranean salt meadows (1410)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)**
1.2i Habitat short name	**Halophilous scrub**
1.3i Habitat description	Halophilous scrub is defined by the EU Habitats Interpretation Manual (Commission of the European Communities, 2007) as perennial vegetation of saline muds that belongs to the phytosociological class *Sarcocornetea fruticosi*. Three British NVC communities listed include the M21 *Suaeda vera-Limonium binervosum* saltmarsh community, SM25 *Suaeda vera* saltmarsh community and SM7 *Arthrocnemum perenne* stands (Rodwell, 2000). Irish vegetation corresponds somewhat with the community *Arthrocnemum perenne* stands (SM7). This habitat is characterised in Ireland by the presence of a single species, Perennial Glasswort (*Sarcocornia perennis*, previously known as *Arthrocnemum perenne*) on saltmarsh. This fleshy, slightly woody perennial can grow up to 30 cm tall and often extends to form tussocks up to 1 m in diameter. Davy *et al*. (2006) described the main habitat of *Sarcocornia perennis* as being gravelly or sandy foreshores and relatively well-drained sediments of coastal saltmarshes. This species is very rare in Ireland and is listed on the Flora (Protection) Order (Anon., 2022). It is also listed in the Vascular Plant Red List as 'Vulnerable' (Wyse Jackson *et al*., 2016). Consequently, this habitat is the rarest Annex I saltmarsh habitat found in Ireland and has been recorded from only seven saltmarsh sites in the south-east coast of Ireland. All seven sites are within two SACs (Ballyteige Burrows SAC 000696 and Bannow Bay SAC 000697). *Sarcocornia perennis* was only recorded quite recently in Ireland (Ferguson, 1962; 1964) and is considered to represent a South Atlantic element in the flora (Cross, 2006). Perennial Glasswort is generally found in the mid-lower saltmarsh zone, often with Common Saltmarsh-grass (*Puccinellia maritima*) and Lax-flowered Lavender (*Limonium humile*). It also occurs with glasswort species (*Salicornia* spp.) and amongst clumps of Common Cord-grass (*Spartina anglica*). The 1420 habitat does not constitute a distinct vegetation community within the Irish Vegetation Classification (IVC) (Perrin, 2025), but is included within the SM2 *Puccinellia maritima-Spergularia media* group.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2006-2024***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The range and distribution 10x10 km grid cell maps were compiled using polygons mapped as containing 1420 habitat by a coastal habitat survey conducted between 2021 and 2023 (NPWS, in prep.); all sites known to support 1420 were surveyed. Data sources listed in section 3.4 that recorded the 1420 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g., based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 1420 habitat. Following a comparison with the distribution from the previous reporting round (NPWS, 2019), one 10x10 km grid cell was added during the current reporting period. This resulted in the distribution increasing from three cells and returning to the figure reported in NPWS (2013). This increase represents a genuine change in the distribution between reporting periods, as the 1420 habitat had recovered at one subsite Taulaght (Bannow Bay SAC 000697), resulting in the reinstatement of this one 10x10 km grid cell in the distribution.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Anon. (2022) Flora (Protection) Order, 2022 (S.I. No. 235/2022). Government of Ireland. Brophy, J.T., Perrin, P.M., Penk, M.R., Devaney, F.M. & Leyden, K.J. (2019) Saltmarsh Monitoring Project 2017-2018. *Irish Wildlife Manuals*, No. 108. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

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4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***400 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** d) yes, due to the use of different method *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="6">4.12 Favourable reference range</td><td colspan="2">a) 400 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:

☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: <u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information

Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 1420 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. All 10x10 km grid cells generated by the range tool had coastline or suitable estuarine habitat.

The number of 10x10 km grid cells in the range (four) is one cell more than the last monitoring period (NPWS, 2019), with the current range returning to the figure reported in NPWS (2013). This change is due to the recovery of the 1420 habitat at one subsite (Taulaght within the Bannow Bay SAC 000697). The algal mats, believed to be the result of eutrophication of the associated waterbody, that were reported to have smothered the 1420 habitat are no longer having an impact, with 0.12 ha of 1420 reported for the Taulaght subsite during the current reporting period.

Short-term trend in Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). The trend is stable due to the area of 1420 lost to algal mats having recovered and extended the range back to 2013 levels (NPWS, 2013).

The long-term trend was estimated to be stable based on the data from the current reporting period and the previous two reporting periods (NPWS 2013; 2019).

The Favourable Reference Range is unchanged, with the same figure reported as for the last two reporting periods (NPWS 2013; 2019).</td></tr>
</table>

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2006-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0035 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 0.138 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high/****moderate/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 2006 (McCorry, 2007) when the pilot baseline survey was carried out, and incorporates updates made by surveys carried out between 2006 and 2023, the details of which are listed in section 3.4, namely McCorry & Ryle (2009), Brophy *et al*. (2019), Perrin (2018), and NPWS (in prep.). Given the limited range of the habitat in Ireland, it is unlikely that there are any areas of unmapped 1420 in the country. During the current reporting period the two SACs, Ballyteige Burrows SAC 000696 and Bannow Bay SAC 000697, that contain 1420 habitat were visited and any areas of 1420 habitat that were located across the seven known subsites (five in Bannow Bay and two in Ballyteige) were assessed. These sites make up the total area of 1420 habitat recorded in Ireland. In NPWS (2013), the Favourable Reference Area (FRA) was set as more than 25% greater than the area calculated for that reporting period (0.011 km^2) and, at that time, the habitat was known to have been lost from two subsites (Duncormick and Grange, subsites of the Ballyteige Burrows and Bannow Bay SACs). The 1420 habitat was not relocated within these two subsites in 2019 (NPWS, 2019) or during the current reporting period. For the current reporting period, an exact figure is presented for the FRA, which following on from NPWS (2013) is 25% greater than 0.011 km^2. The reason for setting this figure of 0.138 km^2 is to provide a target for restoration efforts. As noted in NPWS (2013; 2019), the mapping of the 1420 habitat is problematic as it can change depending on whether clusters of plants are divided into separate patches of habitat or included in one patch of habitat, with the latter method increasing the area significantly. This is exacerbated by the fact that the total area of this habitat nationally is very small. The mapped area of 1420 habitat covers 0.0035 km^2, an increase of 0.07 ha, or 20% of the total reported area, compared with the figure reported in NPWS (2019). This increase in area is due to the algal mats, reported to have smothered the 1420 habitat in NPWS (2019), no longer having an impact, with 0.12 ha of 1420 reported for the Taulaght subsite during the current reporting period. Due to the small area of 1420 habitat recorded in Ireland, small fluctuations in area can result in relatively large increasing or decreasing trends. Short-term trend in Area was deemed to be *stable*, which is a change from *decreasing* that was reported in NPWS (2019). However, there were 0.025 ha of anthropogenic losses recorded during the current reporting period due to invasion by the non-native species Common Cord-grass (*Spartina* agg.). The long-term trend in Area was deemed to be *decreasing*, as the current area is below the figure of 0.011 km^2 reported by NPWS (2013). A long-term *decreasing* trend was also reported in the last reporting period (NPWS 2019).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.0027 km²***
		Maximum	***0.0027 km²***
	b) Area in not-good condition	**Minimum**	***0.0008 km²***
		Maximum	***0.0008 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	The list of typical species is the same as that utilised during the last reporting period (NPWS, 2019). Where sites surveyed in 2021-23 were previously surveyed, plots were repeated in the same locations where possible. New plot locations were chosen where it was not possible to repeat an existing plot and at sites not previously surveyed. Plots measured 2 m x 2 m and all species within the plots were recorded. The species listed below were assessed as part of the site assessment criteria. For further details, see Brophy *et al*. (2019) and NPWS (in prep.). The typical species for the 1420 habitat are: *Sarcocornia perennis*, *Salicornia* spp., *Puccinellia maritima*, *Limonium humile*, *Plantago maritima*, *Suaeda maritima*, *Aster tripolium*, *Spergularia marina* and *Atriplex portulacoides*.		
6.8 Additional information *Optional*	During the current reporting period, the two sites in the State, Ballyteige Burrows SAC 000696 and Bannow Bay SAC 000697, that contain the 1420 habitat were visited and assessed for Structure and functions across five subsites where the habitat was recorded (four in		

	Bannow bay and one in Ballyteige). These sites make up the total area of 1420 habitat recorded in Ireland. Of the 0.0035 km² assessed for Structure and functions in this reporting period, 77.6% of the area was assessed as *Favourable* and 22.4% was assessed as *Unfavourable*. The fact that between 75% and 90% of the habitat is in good condition equates to an assessment of *Unfavourable-Inadequate* for Structure and functions. The approach used to estimate the percentage of the 1420 habitat in *Unfavourable* condition at each subsite is as follows: If none of the assessment criteria failed at the subsite level, the whole area of 1420 in the subsite was assessed as *Favourable*. If one or two criteria failed at the subsite level, 10-25% was considered to be in poor (not-good) condition, unless clear indications of poor conditions were more widespread, and the 1420 habitat was assessed as *Unfavourable-Inadequate*. If three or more criteria failed, 75-100% of the habitat was considered to be in poor condition and the 1420 at the subsite was classified as *Unfavourable-Bad*. The exact value was determined based on the area that met the criteria of the habitat assessment. The most frequent assessment criteria to fail was 'Presence of *Spartina* spp. within vicinity of habitat' and *Spartina* was also a key driver of *Unfavourable* condition in 2019. During the last two reporting periods, 88% (NPWS, 2019) and ≥ 90% (NPWS, 2013) of the 1420 habitat was assessed as *Favourable* (NPWS, 2019). The short-term trend of habitat area in good condition was assessed as *stable* given that it remains in *Unfavourable-Inadequate* condition.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
The pressures are listed below, ranked on the basis of frequency, severity of influence, and area affected.			
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	High
PK02 Mixed source marine water pollution (marine and coastal)	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Spartina* spp.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats listed in section 7.1 were selected and ranked based on a combination of frequency of occurrence, intensity (high, medium or low), and area of impact, using the data gathered during the 2021-23 coastal surveys (see 7.3 for sources). In addition, all pressures presented in NPWS (2019) were considered for the current reporting period. The one high-ranked pressure listed in NPWS (2019), PK02 'Mixed source marine water pollution (marine and coastal)', was retained based on expert opinion as a medium-ranking pressure for the current monitoring period, as pollution of coastal waters is still an issue for saltmarsh habitats such as 1420. PI02 'Other invasive alien species (other than species of Union concern)' was listed as a medium-ranking pressure in NPWS (2019) (under code I02) and this has been changed to high influence based on the data collected during the current reporting period. PI02 is the most significant pressure reported during the current reporting period. It relates to *Spartina* spp. invasion, which was recorded at all of the surveyed sites and subsites during the current reporting period. This is listed as the top pressure as it affects large areas (61% of the total 1420 area), affecting both area and structure and functions, and its influence was deemed by surveyors to be high in almost all cases. PM07 'Natural processes without direct or indirect influence from human activities or climate change' took the form of natural erosion that may have washed away 1420 habitat and *Sarcocornia perennis* plants. The impact was recorded at two of the surveyed subsites within the Bannow Bay SAC and 11% of the 0.0035 km² survey area was affected. Climate change (discussed below) may be impacting erosion through sea level rise and an increase in extreme weather events. The other two pressures recorded during the current reporting period were each only recorded at one or two subsites and ≤ 1% of the survey area. PA08 'Extensive grazing or undergrazing by livestock' was recorded at two subsites, with undergrazing leading to a rank sward which is negatively impacting the 1420 habitat. PA22 'Drainage for use as agricultural land' was recorded at one subsite

	to highlight the impact from a maintained drain that runs through the 1420 habitat. As in NPWS (2019), climate change has not been added as an impact of medium or high importance for the 1420 habitat, but it is likely to affect its range over the coming decades. The long-term trend will see an increase in mean sea level and extreme weather events (Desmond *et al*., 2017), which will impact the formation, stabilisation and vegetation communities of the 1420 habitat. In particular, there may be a higher incidence of succession to non-Annex habitats such as swamp. Furthermore, climate change may have unknown impacts on the physiology of invasive species such as *Spartina* spp. that may increase the spread of these species in saltmarsh habitats.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019-2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	*Active measures:* MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities *Additional measures not currently active but recommended:* MI03 Management, control or eradication of other invasive alien species
8.7 Additional information *Optional*	Saltmarsh habitats were not targeted by any of the actions listed for the GLAS agri-environment scheme (Image & Forster Brown, 2018), but saltmarsh habitats are recognised in the ACRES Co-operative (CP) scheme in the scorecard for "coastal grassland habitats", which includes dunes, machair and saltmarsh. Payments are results-based, i.e. linked to scorecard results, thus incentivising landowners to lessen or eliminate negatively scoring issues such as pollution or habitat damage, so as to qualify for higher payments. The measures employed by landowners to address issues noted on ACRES CP scorecards may be varied and could fall under a number of different conservation measure codes. Ballyteige Burrows SAC is owned by the NPWS and measure MA05 'Adapt mowing, grazing and other equivalent agricultural activities' is being implemented to ensure that the saltmarsh habitats at the site, including 1420, are neither over- nor undergrazed. During the current reporting period, grazing levels were not recorded as a negative impact at the Ballyteige Burrows site. Eutrophication is less of an issue within Bannow Bay SAC saltmarsh during the current reporting period as algal mats are no longer recorded as negatively impacting on the 1420 habitat. Based on this probable reduction in nutrient status it is assumed that MA10 'Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities' is being implemented to some degree during the current reporting period. MI03 'Management, control or eradication of other invasive alien species' could be considered for *Spartina anglica* but given the complexity of the issue this would need to be subject to a comprehensive assessment. This is no doubt the reason for the

	exclusion of *Spartina anglica* from the ACRES CP invasive species assessment. As noted in NPWS (2019), from a long-term standpoint, MJ02 'Implement climate change adaptation measures' is likely to be required to address the issue of climate change. Sea level rise will impact negatively on 1420 area (Horton *et al*., 2018) and measures such as managed retreat may be required to maintain 1420 Area and Structure and functions parameters.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / Poor / **Bad** / Unknown*
	c) Structure and functions	*Good / Poor / **Bad** / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1420 habitat. Future prospects of Range are therefore *Poor*. Short-term trend direction of Area is assessed as *Stable*. Current area is >10% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Bad*. Future trend of Area is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1420 habitat, and to increase the habitat area to the FRA. Future prospects of Area are therefore *Bad*. Between 75% and 90% of the habitat not in good condition corresponds to an *Unfavourable-Inadequate* assessment. The conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. The current Structure and functions assessment of 77.6% of 1420 habitat in good condition is down from 88% in the last reporting period. The short-term trend direction of Structure and functions is *stable* because the habitat has remained *Unfavourable-Inadequate* with the same primary factor responsible for poor condition. Future trend of Structure and functions is assessed as *negative* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1420 habitat. As the current conservation status of Structure and functions is *Unfavourable-Bad*, the Future prospects of Structure and functions are assessed as *Bad*.	

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*

Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
a) No, there is no difference	*a) No, there is no difference*
b) yes, due to genuine change	*b) yes, due to genuine change*
c) yes, due to improved knowledge/more accurate data	***c) yes, due to improved knowledge/more accurate data****
d) yes, due to the use of different method	*d) yes, due to the use of different method*
e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
f) yes, due to other reasons	*f) yes, due to other reasons*

10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, which has changed from *Unfavourable-Bad* in the previous reporting period. This is due to the algal mats, reported to have smothered the 1420 habitat in NPWS (2019), no longer having an impact and the 0.12 ha of 1420 reported for the Taulaght subsite restoring the Range to the 400 km² reported in NPWS (2013). The Conservation Status of Area is *Unfavourable-Bad*, which is the same as the previous reporting period. Area is *Unfavourable-Bad* due to the current area being more than 10% below the Favourable Reference Area. Loss of habitat continues to occur due to *Spartina* invasion into the 1420 habitat, but there has been a net increase in the area of the habitat during the current reporting period, mostly due to the 0.12 ha of 1420 reported for the Taulaght subsite now that that algal mats are no longer impacting on the habitat.

	The Conservation Status of Structure and functions was assessed as *Unfavourable-Inadequate* during this reporting period, unchanged from the outcome of the previous reporting period. The Conservation status of Future prospects remains *Unfavourable-Bad* as insufficient conservation measures have been identified to counteract the listed pressures, such as the expansion of the invasive *Spartina* spp. into the 1420 habitat. The Overall Conservation Status is assessed as *Unfavourable-Bad*, the same as the last reporting period. The trend in Overall Conservation status is assessed as *stable* during the current reporting period, as the short-term trend in Range and Area are *stable*, with Structure and functions remaining *stable* in the short term. *Note: There is an inconsistency between this and the option selected in the EEA's online Reportnet 3 system, in which "a) No, there is no difference" was incorrectly selected. Trend in 2019 was deteriorating. Trend in 2025 is stable.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0035 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable /* ***increasing*** */ decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile. The area given in section 11.1 is the total area of 1420 habitat in SACs in the country. The habitat occurs in two SACs, Ballyteige Burrows SAC 000696 and Bannow Bay SAC 000697, and is a qualifying interest (QI) in both. For the previous two reporting periods (NPWS 2013; 2019) losses in the 1420 area within the SAC network were reported. For the current reporting period there is an overall net gain in the area of 1420 habitat within the SAC network. Therefore, the short-term trend for area within the network is *increasing*, as it is nationally. The short-term trend of the habitat area in good condition within the SAC network is *stable*, with the same trend as the 1420 habitat nationally, as all of the 1420 habitat in Ireland is within the SAC network.

12 Complementary information *N/A*

Halophilous scrub (1420)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2110 Embryonic shifting dunes**
1.2i Habitat short name	**Embryonic shifting dunes**
1.3i Habitat description	2110 Embryonic shifting dunes represent the early stages of the development of sand dune systems. This habitat is formed when small mounds of sand begin to accumulate around strandline plants and drift material, allowing species such as *Elymus junceiformis* (Sand Couch-grass) and *Leymus arenarius* (Lyme-grass), which are salt and drought tolerant, to establish. Other plants such as *Cakile maritima* (Sea Rocket), *Honckenya peploides* (Sea Sandwort) and *Salsola kali* (Prickly Saltwort) may also occur. The presence of these species allows for the continued accumulation of airborne sand and embryonic dune formation. These embryonic dunes are transient in nature, some are eliminated by storms, while others proceed to the next stage of succession, continuing to accumulate sand deposits.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1996-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2110 polygons mapped by the Coastal Habitat Monitoring Project surveys (Gallagher *et al.*, in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.), Wilson & Duff (2014), Delaney *et al.* (2013), and Ryle *et al.* (2009). All of the datasets listed above which were published prior to 2019 were also used to compile the distribution map for the last reporting period (NPWS, 2019). However, some polygons from these datasets may not have been included in determining the current distribution of 2110 in cases where the data have been superseded by a more recent survey. A certainty rating system was applied to each polygon that informed the distribution map. The rating system uses a range from 1 – 3, with 3 representing the highest level of certainty and 1 representing the

	lowest level of certainty. All polygons that were subject to a walkover field survey in 2022/2023 as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 3. Any polygons which were only viewed from a distance in the field, or subject to desktop survey as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 2. Data from Wilson & Duff (2014) and Delaney *et al.* (2013) were assigned a certainty level of 3 in the previous round of reporting. However, given the age of these data (now 10 years or older), a certainty level of 2 was assigned for the current round of reporting. Data from Ryle *et al*. (2009) was assigned a certainty level of 2 in the last round of reporting. As these data are now nearly 20 years old, a certainty level of 1 was assigned in the current reporting period. This was also the case with data from Crawford *et al.* (1996) which was assigned a certainty level of 2 in the previous reporting period, but as the data are now over 20 years old, were assigned a certainty level of 1 in the current reporting period. Data from Fingal County Council (2010) were assigned a certainty level of 2 in the previous reporting period, which was retained in the current reporting period. All polygons with a certainty rating of 1 or 2 were then individually assessed to confirm their certainty rating. All polygons with certainty 1 to 3 were used to map the distribution of the 2110 habitat. It should be noted that as some polygons are now more than 20 years old, follow up surveys should be undertaken to confirm the presence of 2110 habitat at these locations. During the previous reporting period additional data sources which contributed to the creation of the distribution map of 2110 were Martin *et al.* (2017) and Devaney *et al.* (2014). The data from both of these surveys were superseded by the Coastal Habitat Monitoring Projects data in the current round of reporting, as these sites were revisited and field surveyed in 2022/2023.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Crawford, I., Bleasdale, A. & Conaghan, J. (1996) Biomar Survey of Irish machair. A report to the National Parks and Wildlife Service, Dublin. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

	Dún Laoghaire-Rathdown County Council (date unknown) Habitat_Inland_Coastal_polygon.shp. Fingal County Council (2010) Habitat_Polygons.shp. Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Wilson, F. & Duff, K. (2014) Derrynane National Historic Park dune grassland survey and management recommendations. Unpublished report for The Office of Public Works, Knockreer House, Killarney, Co. Kerry.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***15,300 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***

	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) In km^2</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">In the previous two reporting periods (NPWS 2013, NPWS 2019) the Favourable Reference Range was set at 14,700 km^2. During the previous reporting period it was noted that there was no evidence of anthropogenic loss in range since the Directive came into force and the geographic spread was considered sufficient for the long-term survival of the habitat.

The increase in range (c. 5%) in the current reporting period is due to genuine expansion of the range of 2110 and has resulted in a range value greater than the Favourable Reference Range (FRR) that was previously set (NPWS, 2013, 2019). This is due to the natural fluctuations that are typical of dynamic fore dune habitats which is not among the options provided in 4.2, so ‘f) yes, due to other reasons’ has been selected. As we continue to survey this habitat we are likely to find new areas where 2110 Embryonic dunes can occur and so the FRR can be considered a minimum value.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of 2110 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Sixteen 10x10 km grid cells generated by the range tool that had no coastline, or no coastline capable of supporting 2110, were removed (B81, B92, C43, F82, F93, G03, G68, G74, G78, G88, L87, O15, R19, S91, T16 and Q82).

Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the anthropogenic area losses recorded during the current reporting period led to a contraction in the range and the increase in range in the current reporting period was due to natural factors rather than habitat restoration, and so the short-term trend is stable.</td></tr>
</table>

	The number of 10x10 km grid cells in the current range (153) represents an overall increase of seven grid cells. All 10x10 km grid cells that were in the range during the previous reporting period (NPWS, 2019) were again included in the current range. The inclusion of seven additional grid cells represents a genuine expansion in the distribution, and therefore range, of 2110 in the current reporting period.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.09 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	

5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***1%***
	b) Estimated Maximum	***1%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	During the previous reporting period (NPWS, 2019) Favourable Reference Area was estimated to be approximately equal to the area reported (2.17 km^2), however an exact figure was not determined. At that time some minor area losses due to one-off beach cleaning were reported, but it was noted that this would not permanently remove the habitat. As there had been little evidence of anthropogenic losses of 2110 habitat since the Directive came into force, it was assumed that the current range at that time was approximately equal to the Favourable Reference Area for the habitat.	
5.17 Additional information *Optional*	The area of 2110 reported here is based on distribution shapefiles of 2110, mainly from recent field data (2022/2023), but also including older data from previous surveys. Loss of 0.018 km^2 was recorded during the current reporting period due to erosion as a result of recreational pressures at a single site (0.006 km^2), expansion of *Hippophae rhamnoides* at two sites (0.0003 km^2), and the creation of a sports pitch at a single site (0.01 km^2). Short-term trend in Area was assessed as *decreasing* due to this loss of 0.018 km^2 of 2110 habitat during the current reporting period as a result of anthropogenic activity. Long-term trend in Area was also assessed as *decreasing* due to this habitat loss. No losses in area of 2110 habitat due to anthropogenic activity were reported during the previous two reporting periods.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***1.82 km²***
		Maximum	***1.82 km²***
	b) Area in not-good condition	**Minimum**	***0.27 km²***
		Maximum	***0.27 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as the last reporting period (NPWS, 2013) and was devised by Delaney *et al.* (2013). The Structure and functions criteria used to assess the 2110 habitat are listed in Appendix I of Delaney *et al.* (2013). Typical species: *Elymus junceiformis* (previously known as *Elytrigia juncea*), *Leymus arenarius*.
6.8 Additional information *Optional*	During the current reporting period, the Structure and functions of 2110 were assessed at 37 sites using field survey data. An additional three sites were field surveyed and had 2110 habitat present, but the area of 2110 present was below the minimum size threshold required to carry out an assessment of Structure and functions. During the previous reporting period, data were only available to assess the Structure and functions of 2110 habitat at seven sites. Structure and functions were assessed as *Favourable* at all seven sites and so 100% of the habitat was considered to be in good condition. As it was not felt that this was necessarily representative of the condition of the habitat at the national scale, the figure of 87% of habitat being in good condition from the previous reporting period (NPWS 2013) was used. During the current reporting period, the Structure and functions of 2110 was assessed using data collected during field surveys at 37 sites representing 27% of the current area of 2110 habitat nationally. This is deemed to be a good sample size with a good geographic spread and is assumed to be a representative sample of the habitat nationally. Therefore the percentage of 2110 habitat in good condition at these 37 sites was applied to the current area of 2110 to determine the area of habitat in good condition. The area of 2110 where Structure and functions were assessed as being in good condition during the current reporting period accounts for 87% of the total area, which is the same as the area in good condition from NPWS 2013 and the figure that was used in NPWS 2019. Therefore the short-term trend is determined to be *stable*. The approach used to estimate the percentage of 2110 habitat in good condition at each site was as follows: If none of the Structure and functions assessment criteria failed at the site level and there was an absence of any impacting activities resulting in areas in not-

	good condition, 100% of the area was classified as being in good condition. In the instance where one or more of the Structure and functions criteria failed the assessment, the area of habitat where measures would need to be taken for those assessment criteria to pass was assigned as the area in not-good condition. This represents a change in methodology compared to the previous reporting period (NPWS 2019), where the failure of one criterion resulted in 25% of the area being considered to be in not-good condition, and the failure of two or more criteria resulted in between 25-100% of the area being considered in not-good condition. During the current assessment period the most frequent criteria to fail the assessment were 'interference with sediment dynamics' (seven sites) and 'damage due to disturbance' (seven sites). 'Non-native species' and 'flowering or fruiting of positive indicator species' failed at a single site each.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PF04 Development and maintenance of beach areas for tourism and recreation	Ongoing and likely to be in the future	Minority <50%	High
PJ04 Sea-level rise due to climate change	Ongoing and likely to be in the future	Minority <50%	High
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PM01 Storm or cyclone	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PC06 Dumping/depositing of inert and dredged materials from terrestrial and marine extraction	Ongoing	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	Low
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PK05 Mixed source soil pollution and solid waste (excluding discharges)	Ongoing and likely to be in the future	Minority <50%	Low
e) Invasive alien species of Union concern	N/A		

f) Other invasive alien species *Optional*	*Hippophae rhamnoides* (Sea-buckthorn) is a pressure and a threat to 2110 habitat at Buckroney Dunes and Cahore and has resulted in loss of 2110 at both of these sites during the current reporting period.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Data relating to pressures and threats was collected during field surveys during the current reporting period by the Coastal Habitat Monitoring Project surveys (Gallagher *et al.*, in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.). Data relating to pressures were recorded at individual sites then collated and interpreted at a national level. At the site level the following information was collected regarding pressures: impact, influence, occurrence, timing, trend, and area impacted. These data were collated and interpreted, assigning values for timing, scope, and influence at a national scale. At the national level, timing was recorded for each pressure under one of three categories: 'Past/suspended', 'Ongoing', and 'Ongoing/future'. When determining timing at the national level, the most current option was selected. For example, if a pressure was recorded as 'Past/suspended' at one or more sites, but was also recorded as Ongoing/future at one or more sites, then 'Ongoing/future' was selected as the timing at the national level. When determining scope, the total area recorded as being impacted by the pressure at individual sites was totalled and expressed as a percentage of the total area of the habitat nationally. Typically this resulted in values within the 'Minority <50%' category. To determine the influence of the pressure at a national level the influence at individual sites was considered in addition to the level of impact of the pressure (neutral/negative), and the area impacted at the site level in order to determine an average value not only amongst the sites surveyed, but at a national level. Where multiple values for influence were selected across sites, a best attempt at selecting a representative average value was made. For instance, if a pressure was recorded as having a high neutral impact at one site but a medium negative impact at a second site a 'Medium' influence would be assigned to the pressure at the national level. If a pressure was only recorded at a single site, having a high neutral impact over a very small area, then this was assigned as having a 'Low' influence at the national level. All recorded pressures were collated and ranked, however only those pressures that are clearly linked to area loss or failures in the structure and functions of the habitat are seen as being of highest importance, as addressing those pressures should contribute to an improvement in the overall conservation status of the habitat.

	A total of 62 pressures were recorded across 32 sites. PF05 was the most commonly recorded pressure (28 sites), followed by PF15 (13 sites). PF05, PA07, and PF04 were all noted to contribute to the failure of Structure and functions criteria for this habitat. In addition, pressure PI02 has resulted in a loss of 2110 habitat. While additional pressures were also noted within 2110 habitat nationally, PF05, PA07, PF04 and PI02 have been identified as negatively impacting the current conservation assessment of this habitat. The most frequently recorded pressure in 2110 habitat was PF05 (28 sites). Pressures recorded under the code PF05 were typically associated with walking and trampling, with off-road driving/vehicle tracks recorded at a small number of sites. These pressures were typically categorised as low- to medium-intensity pressures at the sites where they were recorded. The second most frequently recorded pressure was PF15 (13 sites), due to the presence of sea walls and rock armour at these locations. In the majority of cases these coastal structures have been in place since before the Directive came into force and so were typically classified as having a neutral influence on 2110 habitat. Although only recorded at two sites, PI02 poses a significant threat to 2110 habitat and the presence of *Hippophae rhamnoides* has resulted in the loss of 2110 habitat in the current reporting period. Pressures related to climate change (PJ04 and possibly PM01) were noted at four sites. Climate change is likely to impact 2110 habitat over the coming decades. It is expected that long-term increases in sea level and extreme weather events will impact the formation and stabilisation of 2110 habitat.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	The following conservation measures were noted to be in place in 2110 habitat during the current reporting period: MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MS01 Reinforce populations of species from the directives Note that in the case of MF03, although this measure is in place at some sites, it is required, but not currently being implemented at other locations.
8.7 Additional information *Optional*	MF03 refers to the establishment of sand trapping fencing at a number of sites to reduce and reverse damage caused by trampling in sensitive foredune habitats. It was the most commonly recorded conservation measure, and its implementation at the sites where it has been identified as required but not currently being implemented would help to improve the condition (as evidenced through the Structure and functions assessment) of 2110 habitat moving forward. MS01 refers to signage to encourage beach users to avoid areas used by *Charadrius hiaticula* (Ringed Plover) and *Sterna albifrons* (Little Tern) at a single site. The conservation measures listed below were recorded as required, but not currently being implemented at sites that support 2110 habitat:

	MI03 Management, control or eradication of other invasive alien species MF02 Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities MJ01 Implement climate change mitigation measures The implementation of measure MI03 would help to maintain and possibly restore areas of 2110 habitat impacted by invasive alien species, resulting in an improved conservation assessment for this habitat. The other conservation measures listed are not seen as a requirement to improve the conservation assessment outcome of 2110, but would help to support the habitat generally. The outcome of any recently implemented measures is not yet clear, but the results may be reflected in the next reporting period.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The current range of 2110 is the same as the previous reporting period and although this is one 10x10 km grid cell less than the Favourable Reference Range, this is not attributed to anthropogenic loss. Therefore the current conservation status of Range is *Favourable* and the short-term trend is *stable*. The Future prospects of Range are assessed as *Good*. There was a small loss of 2110 habitat (0.016 km^2) due to anthropogenic activity during the current reporting period. Therefore the current Area assessment for 2110 is *Unfavourable-Inadequate* with a *decreasing* trend. Future prospects of Area are assessed as *Poor*. The Structure and functions of 2110 are assessed as *Unfavourable-Inadequate* in the current reporting period as less than 90% of the habitat is in good condition. The future trend of Structure and functions is assessed as *stable*. Therefore Future prospects of Structure and functions are assessed as *Poor*.	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

<table>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td><u>b) yes, due to genuine change</u></td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range was assessed as Favourable in the current reporting period, while the remaining parameters (Area, Structure and functions, and Future prospects) were assessed as Unfavourable-Inadequate. Area was assessed as Unfavourable-Inadequate due to the anthropogenic loss reported during the current reporting period and Structure and functions were assessed as Unfavourable-Inadequate as <90% of the habitat is in good condition. Unfavourable-Inadequate assessments of Area and Structure and functions resulted in an Unfavourable-Inadequate assessment for Future Prospects also.

The Overall Conservation Status of 2110 is Unfavourable-Inadequate, which is the same as the previous two reporting periods (NPWS 2013, NPWS 2019). The trend in the previous reporting period was stable (NPWS 2019), however this has changed to deteriorating in the current reporting period, due to the change in the assessment of Area from Favourable in the previous reporting period (NPWS 2019) to Unfavourable-Inadequate in the current reporting period.</td></tr>
</table>

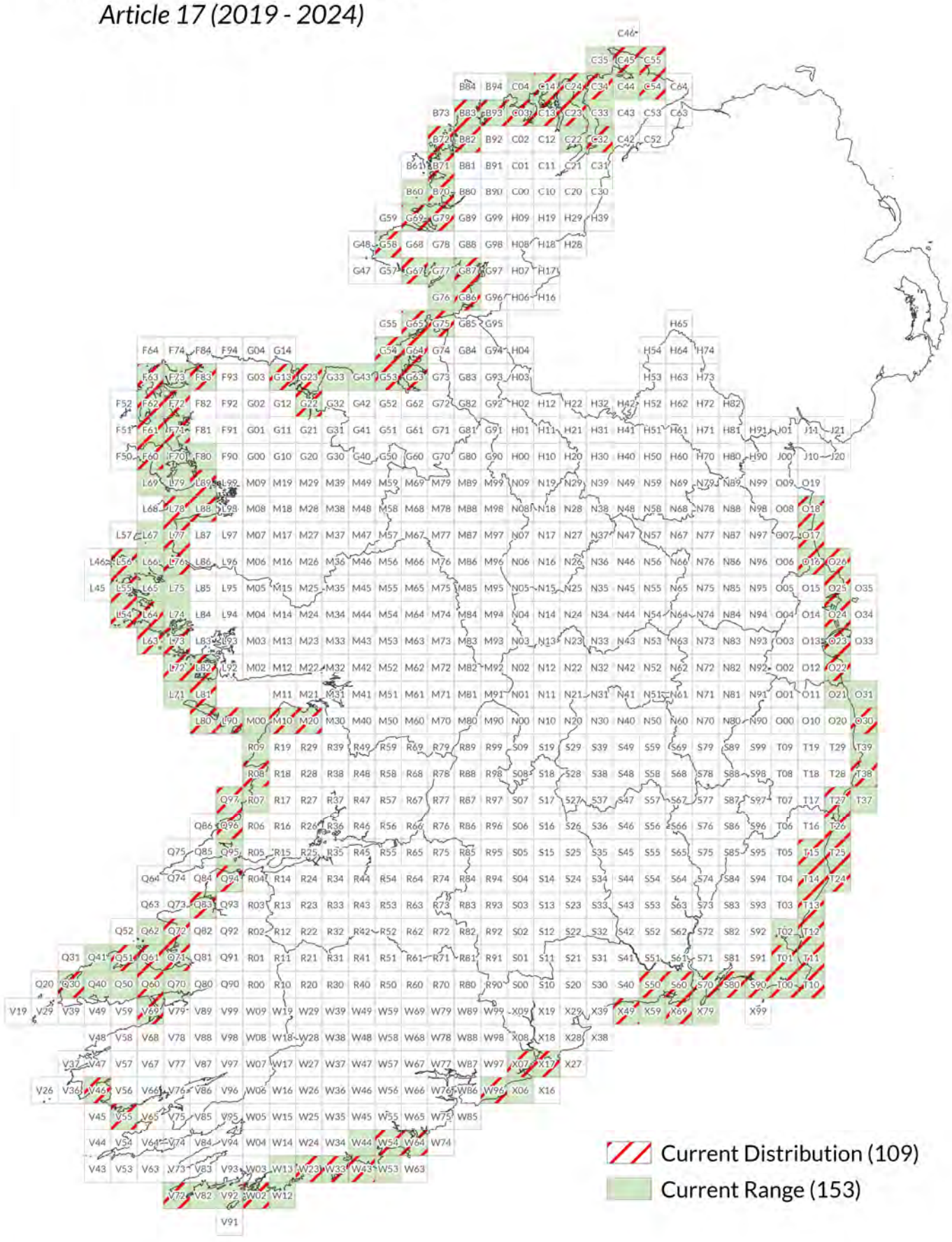
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.72 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / **decreasing** / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefile. The area reported in section 11.1 is the total area of 2110 habitat that occurs within SACs in Ireland, including some SACs where 2110 is not listed as a Qualifying Interest (QI). The area of 2110 that occurs within SACs where the habitat is listed as a QI is 1.39 km².	

	2110 habitat was recorded within 32 SACs which do not have 2110 listed as a QI. There has been a small decrease in the area of 2110 reported within the SAC network since the previous reporting period (NPWS, 2019). This is partly due to natural fluctuations of the habitat and partly due to the loss of 2110 habitat as a result of anthropogenic activities (0.007 km^2). Therefore short-term trend of area within the SAC network is *decreasing*. The short-term trend for habitat area in good condition within the SAC network is determined to be *stable*, which is the same trend as for 2110 habitat nationally (see sections 6.4 and 6.8), as the majority of 2110 habitat surveyed during the last two reporting periods occurred within the SAC network.

12 Complementary information *N/A*

Embryonic shifting dunes (2110)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)**
1.2i Habitat short name	**Marram dunes (white dunes)**
1.3i Habitat description	2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) are dunes that are dominated by *Ammophila arenaria* (Marram Grass) and are partly stabilised. As the sand deposits within the shifting dunes grow, they become elevated above the tide level and become less salty, which facilitates the colonisation of *Ammophila arenaria*. The Marram Grass traps and binds sand, which allows the dunes to grow but vegetation cover is typically incomplete. Despite the stabilising nature of *Ammophila arenaria,* the presence of bare sand means that the dunes can build and erode quickly, giving them the name 'shifting' or 'mobile' dunes. The dominant species occurring in this habitat are *Ammophila arenaria*, *Elymus junceiformis* (Sand Couch-grass) and *Leymus arenarius* (Lyme-grass). Other species that can occur include *Carex arenaria* (Sand Sedge), *Euphorbia paralias* (Sea Spurge), *Eryngium maritimum* (Sea-holly), and a number of yellow Asteraceae.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1996-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2120 polygons mapped by the most recent Coastal Habitat Monitoring Surveys (Gallagher *et al*., in prep.; Rigoni *et al*., in prep.; NPWS, in prep.), Crawford *et al.* (1996), Mayo County Council (2008), Ryle *et al.* (2009), Fingal County Council (2010), Power (2011), NPWS (2012), Delaney *et al*. (2013), and Wilson & Duff (2014). All of the datasets listed above which were published prior to 2019 were also used to compile the distribution map for the last reporting period (NPWS, 2019). However, some polygons from these datasets may not have been included in determining the current distribution of

	2120 in cases where the data have been superseded by a more recent survey. A certainty rating system was applied to each polygon that informed the distribution map. The rating system uses a range from 1 – 3, with 3 representing the highest level of certainty and 1 representing the lowest level of certainty. All polygons that were subject to a walkover field survey in 2022/2023 as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 3. Any polygons which were only viewed from a distance in the field, or subject to desktop survey as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 2. Data from Wilson & Duff (2014) and Delaney *et al.* (2013) were assigned a certainty level of 3 in the previous round of reporting. However, given the age of these data (now 10 years or older), a certainty level of 2 was assigned for the current round of reporting. Data from Ryle *et al*. (2009) was assigned a certainty level of 2 in the last round of reporting. As these data are now nearly 20 years old, a certainty level of 1 was assigned in the current reporting period. All polygons with a certainty rating of 1 or 2 were then individually assessed to confirm their certainty rating. Data from Fingal County Council (2011), Mayo County Council (2008), and Power (2011) were all assigned a certainty rating of 2 in the previous reporting round, which was retained during the current reporting period as the data are over 10 years but less than 20 years old. Data from NPWS (2012) was assigned a certainty rating of 1 in the previous reporting period and this was retained in the current reporting period. Data from Crawford *et al.* (1996) was assigned a certainty rating of 2 in the previous reporting period, this was decreased to a 1 in the current reporting period as the data is now over 20 years old. All polygons with certainty 1 to 3 were used to map the distribution of the 2120 habitat. It should be noted that as some polygons are now more than 20 years old, follow up surveys should be undertaken to confirm the presence of 2120 habitat at these locations. During the previous reporting period, additional data sources which contributed to the creation of the distribution map of 2120 were Devaney *et al.* (2014) and Martin *et al.* (2017). These data have been superseded by the Coastal Habitat Monitoring Projects data in the current round of reporting, as these sites were revisited and field surveyed in 2022/2023.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***

3.3 Additional information	-
3.4 Sources of information	Crawford, I., Bleasdale, A. & Conaghan, J. (1996) Biomar Survey of Irish machair. A report to the National Parks and Wildlife Service, Dublin. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Fingal County Council (2010) Habitat_Polygons.shp. Mayo County Council (2008) Mayo_habitats_polygons_polygon.shp. NPWS (2012) Management Planning Support Unit Maps 2405_imap95. CPU_Habitats_March_2012.shp. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin Power, G. (2011) Dungarvan Habitat Survey. Report prepared for Waterford County Council. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Wilson, F. & Duff, K. (2014) Derrynane National Historic Park dune grassland survey and management recommendations. Unpublished report for The Office of Public Works, Knockreer House, Killarney, Co. Kerry.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***15,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">During the previous reporting period (NPWS, 2019), the Favourable Reference Range (FRR) was increased from 15,300 km^2 to 15,400 km^2 due to the use of a different method. The range value of 15,400 km^2 represented the current range value for 2120 at the time (NPWS, 2019). This value was used as there was no evidence of loss of range since the Directive came into force and the geographic spread was considered sufficient for the long-term survival of the habitat. The Favourable Reference Range has again been increased in the current reporting period to reflect the current range of the habitat (15,900 km^2), which represents a genuine expansion associated with natural fluctuation. Given its dynamic nature, the longer we carry out surveys, the more locations where this fore dune habitat can occur are likely to be discovered and the FRR should be considered a minimum value. Natural fluctuations are not included as an option in 4.2, so ‘f) yes, for other reasons’ has been selected.</td></tr>
</table>

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 2120 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. A total of eighteen 10x10 km grid cells generated by the range tool that had no coastline or no suitable coastline (i.e. rocky shoreline and cliffs) were removed (B81, B92, C43, F93, G03, G68, G78, G88, L74, L87, Q50, Q82, O15, R19, S91, T16, and V63). All 10x10 km grid cells that were included in the range in the previous reporting period (NPWS 2019) were included again, with the addition of five grid cells that were not previously included (3% increase). The inclusion of these grid cells represents a genuine increase in the distribution of the habitat. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the area losses recorded during these two reporting periods led to a contraction in the range and there was an increase in the range of 2120 habitat as a result of an increase in the distribution of the habitat. This increase in distribution is not linked to the implementation of conservation measures and is determined to be due to natural habitat fluctuations, therefore a *stable* trend is assigned. The Favourable Reference Range has increased since the last reporting period (NPWS, 2019) due to a genuine increase in range. The Favourable Reference Range is the current range as reported in 4.1.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.64 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="2">5.5 Change and reason for change in surface area</td><td colspan="2">Is there a change between reporting periods?
(If yes, more than 1 option a) to f) can be chosen)
a) no, there is no change
<u>b) yes, due to genuine change</u>
c) yes, due to improved knowledge/more accurate data
d) yes, due to the use of different method
e) yes, but nature of change is unknown
f) yes, due to other reasons</td></tr>
<tr><td colspan="2">The change is mainly due to (select one of the reasons below):
<u>a) genuine change</u>
b) improved knowledge or more accurate data
c) the use of a different method
d) unknown
e) other reasons</td></tr>
<tr><td>5.6 Short-term trend Period</td><td colspan="2">2013-2024</td></tr>
<tr><td>5.7 Short-term trend Direction</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="4">5.8 Short-term trend Magnitude
Optional</td><td>a) Estimated Minimum</td><td></td></tr>
<tr><td>b) Estimated Maximum</td><td></td></tr>
<tr><td>c) Pre-defined range</td><td>Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.
☐ <u>0 – 12%</u>
☐ 13 - 25%
☐ 26 - 50%
☐ 51 – 100%
☐ >100%</td></tr>
<tr><td>d) Unknown</td><td></td></tr>
<tr><td>5.9 Short-term trend Magnitude Type of estimate</td><td colspan="2">Best estimate / multi-year mean / 95% confidence interval / minimum/<u>pre-defined range</u></td></tr>
<tr><td>5.10 Short-term trend Method used</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend Period
Optional</td><td colspan="2">2000-2024</td></tr>
</table>

5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ ***between 2% and 10% smaller than the FRA*** ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	The Favourable Reference Area (FRA) for 2120 has not been exactly determined. During the previous reporting period (NPWS, 2019) it was estimated to be <10% greater than the area at that time (4.33 km^2). FRA was deemed to be greater than the area reported in NPWS (2019) as some losses due to anthropogenic activities had occurred since the Directive came into force and there had also been losses due to natural processes. In NPWS (2013) a range was provided for the FRA, the maximum of which was set at 4.72 km^2, that was 9% more than the area value reported in NPWS (2019) and is 30% more than the current area.	

5.17 Additional information *Optional*	Area losses as a result of anthropogenic activities were recorded at a number of sites during the current reporting period and total 0.008 km^2. Area losses were due to the expansion of *Hippophae rhamnoides*, erosion linked to recreational pressure, and the expansion of gardens and sports pitches into 2120 habitat. The area losses due to anthropogenic impacts represent <10% of the FRA. The remaining difference in area (0.68 km^2) is due to natural fluctuations, which are to be expected in a dynamic foredune habitat such as 2120. Short-term trend in Area is deemed to be *decreasing* due to the loss of 0.008 km^2 of habitat as a result of anthropogenic activities. Long-term trend in Area is also *decreasing* due to habitat losses as a result of anthropogenic activities reported in NPWS (2013).

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***3.20 km²***
		Maximum	***3.20 km²***
	b) Area in not-good condition	**Minimum**	***0.44 km²***
		Maximum	***0.44 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***		

6.7 Typical species Method used *Optional*	The list of typical species is the same as the last two reporting periods (NPWS 2013, 2019) and was devised by Delaney *et al*. (2013). The Structure and functions criteria used to assess the 2120 habitat are listed in Appendix I of Delaney *et al*. (2013). Typical species: *Ammophila arenaria, Elymus junceiformis* (previously known as *Elytrigia juncea*), *Leymus arenarius.*
6.8 Additional information *Optional*	During the current reporting period, the Structure and functions of 2120 were assessed at 39 sites using field survey data. Two additional sites were field surveyed and had 2120 habitat present, but the area of 2120 was below the minimum size threshold required to carry out an assessment of Structure and functions. During the previous reporting period, data were only available to assess the Structure and functions of 2120 habitat at ten sites representing 13% of the total area of 2120 nationally. Across the ten sites surveyed it was found that 97% of the habitat was in good condition. As it was not felt that this was necessarily representative of the condition of the habitat at the national scale, the figure of 90% of habitat being in good condition from the previous reporting period (NPWS, 2013) was used. The 39 sites where Structure and functions were assessed during the current reporting period represent 36% of the current area of 2120 habitat nationally. This is deemed to be a good sample size with a good geographic spread and is assumed to be a representative sample of the habitat nationally. It was found that 88% of the habitat was in good condition. The approach used to estimate the percentage of 2120 habitat in good condition at each site was as follows: If none of the Structure and functions assessment criteria failed at the site level and there was an absence of any impacting activities resulting in areas in not-good condition, 100% of the area was classified as being in good condition. In the instance where one or more of the Structure and functions criteria failed the assessment, the area of habitat where measures would need to be taken for those assessment criteria to pass was assigned as the area in not-good condition. This represents a change in methodology compared to the previous reporting period (NPWS 2019), where the failure of one criterion resulted in 25% of the area being considered to be in not-good condition, and the failure of two or more criteria resulted in between 25-100% of the area being considered in not-good condition. The previous methodology (NPWS, 2019) would likely have resulted in larger areas of habitat being considered not to be in good condition in comparison to the current methodology. In the current methodology the failure of a single criterion could result in a much smaller area than 25% being assigned as not in good condition, depending on the criterion in question and the number of monitoring stops. Therefore, despite the change in methodology, the decrease in the current reporting period is deemed to be genuine as it is likely that if the current methodology was used during the previous reporting periods the area in good condition would have been higher than that reported in NPWS (2019).

	During the current reporting period the most frequent criteria to fail the assessment were 'damage due to disturbance' (12 sites) and 'interference with the sediment dynamics' (7 sites). Two additional criteria 'non-native species' and 'flowering or fruiting of positive indicator species' both failed the assessment at a single site each. 'Damage due to disturbance' and 'interference with sediment dynamics' were also the most frequent criteria to fail in the last two reporting periods (NPWS, 2013, 2019). The decline in habitat in good condition from 90% to 88% represents a relatively small decrease, however 90% is the threshold value for a Favourable conservation assessment. The decrease to 88% results in a decrease in the conservation assessment of Structure and functions of 2120 to *Unfavourable-Inadequate*. Therefore, the short-term trend is *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PF04 Development and maintenance of beach areas for tourism and recreation	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PJ04 Sea-level rise due to climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PM01 Storm or cyclone	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing	Minority <50%	Medium
PA06 Mowing or cutting of grasslands	Ongoing	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA08 Extensive grazing or undergrazing by livestock	Ongoing	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	Low
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low

PK05 Mixed source soil pollution and solid waste (excluding discharges)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Fallopia japonica* (R18201) (Japanese Knotweed), *Phormium tenax* (R11370) (New Zealand Flax), *Hippophae rhamnoides* (R18921) (Sea-buckthorn), *Crocosmia* x *crocosmiiflora* (R04400) (Montbretia), and *Centranthus ruber* (R03087) (Red Valerian) were recorded at a number of sites. The presence of *Hippophae rhamnoides* (Sea-buckthorn) has resulted in a loss of area of 2120 at a single site.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Data relating to pressures and threats were collected during field surveys during the current reporting period (Gallagher *et al*., in prep.; Rigoni *et al*., in prep.; NPWS, in prep.). Data relating to pressures were recorded at individual sites then collated and interpreted at a national level. At the site level the following information was collected regarding pressures: impact, influence, occurrence, timing, trend, and area impacted. These data were collated and interpreted, assigning values for timing, scope, and influence at a national scale. At the national level, timing was recorded for each pressure under one of three categories: 'Past/suspended', 'Ongoing', and 'Ongoing/future'. When determining timing at the national level, the most current option was selected. For example, if a pressure was recorded as 'Past/suspended' at one or more sites, but was also recorded as Ongoing/future at one or more sites, then 'Ongoing/future' was selected as the timing at the national level. When determining scope, the total area recorded as being impacted by the pressure at individual sites was totalled and expressed as a percentage of the total area of the habitat nationally. Typically this resulted in values within the 'Minority <50%' category. To determine the influence of the pressure at a national level the influence at individual sites was considered in addition to the level of impact of the pressure (neutral/negative), and the area impacted at the site level in order to determine an average value not only amongst the sites surveyed, but at a national level. Where multiple values for influence were selected across sites, a best attempt at selecting a representative average value was made. For instance, if a pressure was recorded as having a high neutral impact at one site but a medium negative impact at a second site, a 'Medium' influence would be assigned to the pressure at the national level. If a pressure was only recorded at a single site, having a high neutral impact over a very small

	area, then this was assigned as having a 'Low' influence at the national level. All recorded pressures were collated and ranked, however only those pressures that are clearly linked to area loss or failures in the Structure and functions of the habitat are seen as being of highest importance, as addressing those pressures should contribute to an improvement in the overall conservation status of the habitat. The following pressures are deemed to be of highest importance as they are resulting in habitat loss or failure of 2120 Structure and function assessment criteria. PF03 – area loss PF04 – S&F failure PF05 – area loss and S&F failure PF15 – area loss and S&F failure PI02 – area loss and S&F failure The most frequently recorded pressure was PF05 (34 sites), followed by PM07 (13 sites), PF15 (12 sites), and PI02 (11 sites). At the site level, the majority of pressures recorded under code PF05 were linked to walking tracks and trampling. In the majority of cases, these were noted to have low- to medium-level negative impacts at the site level. Pressures recorded under PF15 were all noted to have a neutral influence and related to the presence of rock armour or other coastal structures/defences that have been in place (without change) since the Directive came into force. The majority of pressures recorded under the code PM07 were associated with natural erosion and were assessed as being neutral impacts where there was no obvious anthropogenic driver for the erosion. Sea level rise due to climate change (PJ04) was recorded at a single site. Climate change is likely to impact 2120 over the coming decades. It is expected that long-term increases in sea level and extreme weather events will impact the formation and stabilisation of 2120 habitat.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	The following measures were recorded as being in place at some sites that support 2120 habitat nationally during the current reporting period (note that these measures may also have been identified as required, but not currently being implemented at additional sites): MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	The conservation measures listed in 8.6 are those identified as being in place during the current reporting period. Measures that have already been undertaken include planting of *Ammophila arenaria* (Marram), fencing (to trap and retain sand), temporary placement of straw bales, and the use of signage at a number of sites including

	Castlegregory Maharees, Strandhill, and Fanore (recorded as both MF03 and MM01). The majority of sites did not have any conservation measures in place during the current reporting period. The following measures were recorded as required, but not currently being implemented as follows: MF02 Habitat restoration of areas impacted by residential, commercial, industrial, and recreational infrastructure, operations and activities MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change MF03 was the most frequently identified conservation measure (13 sites). Of the other conservation measures that have been identified as being required, but are not currently being implemented, MI03 and MI04 should be prioritised to avoid any further losses of 2120 habitat as a result of invasive alien species. The implementation of this action is required to improve the Area assessment of 2120. Implementation of MI03 and MI04 would also improve the Structure and functions assessment of 2120, with the implementation of MF02, and MF03 also required to improve the outcome of the Structure and functions assessment for 2120. The implementation of MM01 is not currently required to improve the conservation assessment of 2120, but it is likely to be in the future.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The current range is equal to the Favourable Reference Range, which was increased in the current reporting period to reflect an increase in the distribution of the habitat. The increase in range resulted in an *increasing* short-term trend for Range. The future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures currently in place. Future prospects of Range are therefore *Good*. The short-term trend for Area is *decreasing*, due to loss of area as a result of anthropogenic activities during the current reporting period. The loss of area as a result of anthropogenic activities is <10% of the	

	Favourable Reference Area and so the conservation status of Area is *Unfavourable-Inadequate*. Future trend of Area is assessed as *stable* as the implementation of conservation measures would prevent further losses in the future. Future prospects of Area are *Poor*. Current Structure and functions are assessed as *Unfavourable-Inadequate* as <90% (88%) of the habitat is in good condition. The short-term trend of Structure and functions is *decreasing* as the current assessment represents a decline from the *Favourable* assessment (>90% of the habitat in good condition) during the previous reporting period (NPWS, 2019). The future trend of Structure and functions is assessed as *stable*. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*

	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable*, while Area, Structure and functions, and Future prospects are *Unfavourable-Inadequate*. This represents a change from the previous reporting period (NPWS 2019), when Structure and functions were assessed as *Favourable*. The decline in area of habitat in good condition to 88% has resulted in the current assessment of *Unfavourable-Inadequate*. The Overall assessment of Conservation Status is *Unfavourable-Inadequate*, which is unchanged since the previous two reporting periods (NPWS 2013, NPWS 2019). The trend for the Overall assessment of Conservation Status is *deteriorating*, but was *stable* during the previous reporting period. The *deteriorating* assessment is due to the change in the Conservation Status of Structure and functions from *Favourable* to *Unfavourable-Inadequate* in the current reporting period.	

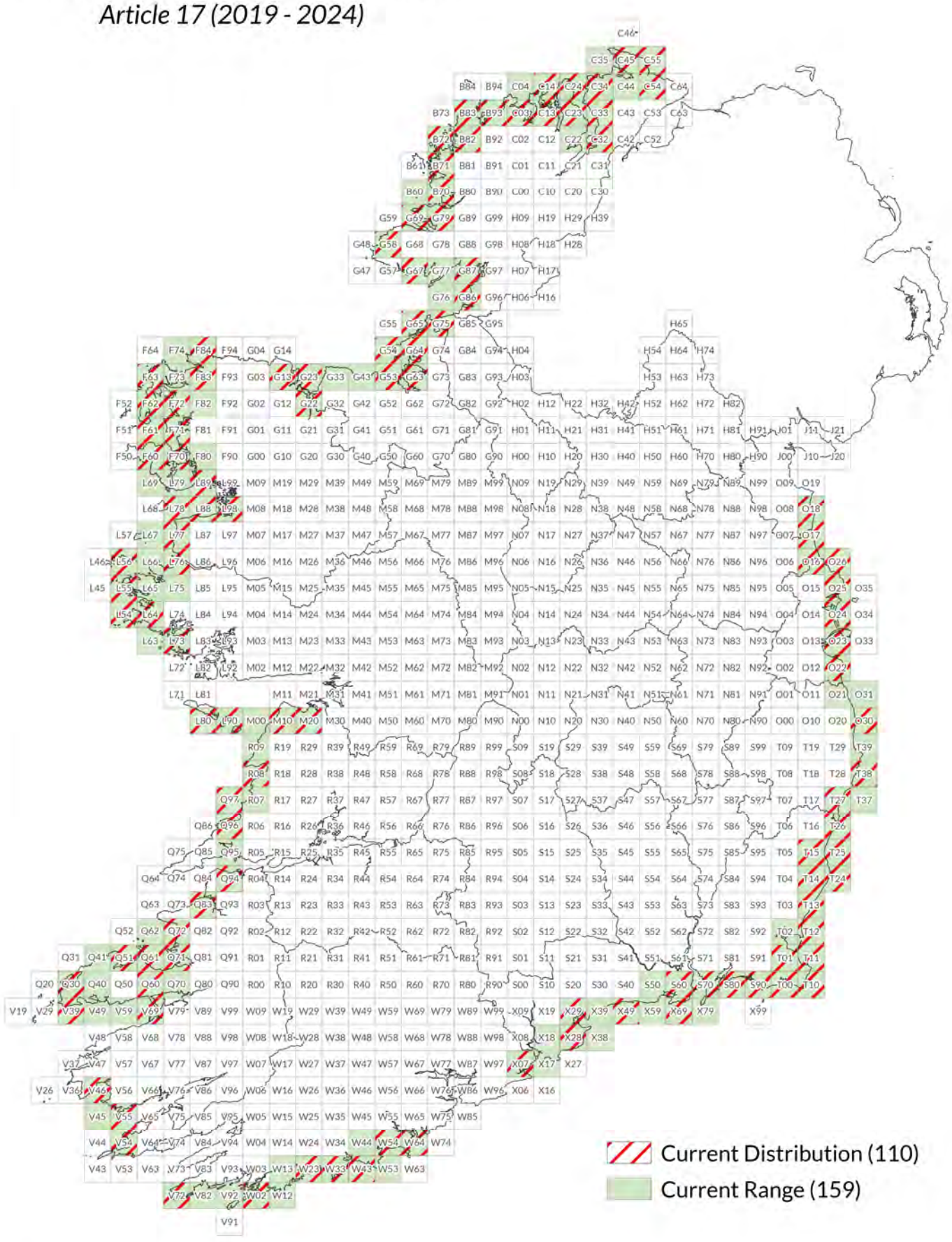
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.15 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefiles. The area provided in section 11.1 is the total area of 2120 habitat in SACs in the country, including some SACs where 2120 is not listed as a Qualifying Interest (QI). The area of 2120 within the Natura 2000 network where it is listed as a QI is 2.88 km^2. There have been losses of 2120 habitat due to anthropogenic activities within the SAC network during the current reporting period. As a result, the short-term trend of habitat area within the SAC network is assessed as *decreasing*. The short-term trend for habitat area in good condition within the SAC network is determined to be *decreasing*, which is the same trend as for 2120 habitat nationally (see sections 6.4 and 6.8), as the majority of 2120 habitat surveyed during the last two reporting periods occurred within the SAC network.

12 Complementary information *N/A*

Marram dunes (white dunes) (2120)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2130 Fixed coastal dunes with herbaceous vegetation ('grey dunes')***
1.2i Habitat short name	**Fixed dunes (grey dunes)**
1.3i Habitat description	Fixed coastal dunes with herbaceous vegetation (grey dunes) are relatively sheltered with sand mobility greatly reduced in comparison to foredune habitats, and have developed a more or less closed carpet of vegetation. The sandy substrate is frequently overlain by a layer of humus, and lichens and mosses are often abundant. Species diversity and composition varies, but usually the fixed dune vegetation is typical of herb-rich grassland. Species such as *Festuca rubra*, *Agrostis* spp., *Achillea millefolium*, *Lotus corniculatus*, *Anthyllis vulneraria*, *Plantago lanceolata*, *Euphrasia* spp., *Thymus polytrichus* and *Galium verum* are common. 2130 fixed dunes can also be an important habitat for orchids such as *Anacamptis pyramidalis* and *Ophrys apifera*.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1995-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2130 polygons mapped by Gallagher *et al.* (in prep.), Rigoni *et al.* (in prep.), NPWS (in prep.), Martin *et al.* (2018a), Martin *et al.* (2017), Long & Brophy (2019), Devaney *et al.* (2014), Wilson & Duff (2014), Woodrow & Denyer (2014), Delaney *et al.* (2013), NPWS (2012), Power (2011), Ryle *et al.* (2009), Fingal County Council (2010) and Crawford *et al.* (1996). In addition to the sources listed above, the distribution map also utilised points digitised from O'Neill & Martin (2017). Area was assigned (using remote imagery) to all points which did not occur within an assigned 2130 polygon. All the aforementioned datasets published prior to 2019 were also used to compile the distribution maps from the last reporting period (NPWS, 2019). All references are detailed below in section 3.4.

	A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1, the lowest. The new data sources added since the last round of reporting (NPWS, 2019), Long & Brophy (2019), Martin *et al.* (2017) and O'Neill & Martin (2017) were judged to be a high certainty of 3. Delaney *et al.* (2013), Devaney *et al.* (2014), Wilson & Duff (2014) and Woodrow & Denyer (2014) were assigned a certainty of 2 because data were recorded more than ten years ago. Finally, Crawford *et al.* (1996), Fingal County Council data (2010), NPWS (2012) polygons and Ryle *et al.* (2009) were assigned a certainty of 1. Polygons found to be unsuitable for the distribution shapefile because they did not represent 2130 habitat were assigned a certainty of 0 and excluded from the distribution shapefile. Points and polygons of the distribution map were checked against aerial imagery and in some instances certainty or habitat percent coverage were amended. All polygons with certainty 1 to 3 were used to map the distribution for the 2130 habitat.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Reference to first report of the habitat: NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps Volume 2. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.
3.4 Sources of information	Crawford, I., Bleasdale, A. & Conaghan, J. (1996) Biomar Survey of Irish machair. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. Devaney, F., Barron, S. & Delaney, A. (2014) Survey of sand dune habitats at Portrane, Co. Dublin. Unpublished report by BEC Consultants Ltd., Dublin. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien & F. McGovern. EPA, Wexford. Fingal County Council (2010) Habitat_Polygons.shp.

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	Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Wilson, F. & Duff, K. (2014) Derrynane National Historic Park dune grassland survey and management recommendations. Unpublished report for The Office of Public Works, Knockreer House, Killarney. Woodrow, W. & Denyer, J. (2014) NIS: The use of designated machair within the West of Ardara / Maas Road SAC and Skeskinmore Lough SPA for the Annual Ardara Agricultural Show. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***16,600 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

<table>
<tr><td>4.7 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>4.8 Long-term trend
Period
Optional</td><td colspan="2">2004-2024</td></tr>
<tr><td>4.9 Long-term trend
Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) In km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: <u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">Following NPWS (2007) the habitat range when the Directive came into force was estimated to be equal to 13,000 km² (130 grid cells x 100 km²), based on Biomar survey (Crawford et al., 1996). During the subsequent reporting periods the Favourable Reference Range was increased to 15,900 km² (NPWS, 2013) and then to 16,600 km² (NPWS, 2019) due to the use of different method and improved knowledge.</td></tr>
</table>

	There is no evidence of loss of range since the Directive came into force and the geographic spread is considered sufficient for the long-term survival of the habitat, therefore the Favourable Reference Range is set as the current range. Given the dynamic nature of this habitat, it is likely that our knowledge of where this habitat can occur will continue to increase with each survey, and the current value can be considered a minimum based on current knowledge.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 2130 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Twelve 10x10 km grid cells generated by the range tool that had no coastline or no suitable coastline (i.e. rocky shoreline and cliffs) were removed. The grid cells omitted are B81, B92, C43, G74, G88, L87, O15, Q82, R19, S91, T16, T29. Short-term trend was estimated based on data from the current reporting period and the 2013 reporting period (NPWS, 2013). None of the area losses recorded during these two reporting periods led to a contraction in the range. The short-term trend is *stable*. The long-term trend was estimated based on data from the current reporting period and the 2007 reporting period (NPWS, 2007). The long-term trend is *stable*. The short-term trend and long-term trend were taken as *stable* despite increases since the 2013 and 2007 reporting periods because this change is due to the use of a slightly different methodology and to improved knowledge. The Favourable Reference Range is the same as the last reporting period (NPWS, 2019). The Favourable Reference Range is the current range, reported in 4.1.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***76.44 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="2">5.5 Change and reason for change in surface area</td><td colspan="2">Is there a change between reporting periods?
(If yes, more than 1 option a) to f) can be chosen)
a) no, there is no change
<u>b) yes, due to genuine change</u>
<u>c) yes, due to improved knowledge/more accurate data</u>
d) yes, due to the use of different method
e) yes, but nature of change is unknown
f) yes, due to other reasons</td></tr>
<tr><td colspan="2">The change is mainly due to (select one of the reasons below):
a) genuine change
<u>b) improved knowledge or more accurate data</u>
c) the use of a different method
d) unknown
e) other reasons</td></tr>
<tr><td>5.6 Short-term trend Period</td><td colspan="2">2013-2024</td></tr>
<tr><td>5.7 Short-term trend Direction</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="4">5.8 Short-term trend Magnitude
Optional</td><td>a) Estimated Minimum</td><td></td></tr>
<tr><td>b) Estimated Maximum</td><td></td></tr>
<tr><td>c) Pre-defined range</td><td>Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.
☐ <u>0 – 12%</u>
☐ 13 - 25%
☐ 26 - 50%
☐ 51 – 100%
☐ >100%</td></tr>
<tr><td>d) Unknown</td><td></td></tr>
<tr><td>5.9 Short-term trend Magnitude Type of estimate</td><td colspan="2">Best estimate / multi-year mean / 95% confidence interval / minimum/<u>pre-defined range</u></td></tr>
<tr><td>5.10 Short-term trend Method used</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend Period
Optional</td><td colspan="2">2004-2024</td></tr>
</table>

<table>
<tr><td>5.12 Long-term trend Direction

Optional</td><td colspan="2">stable / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend Magnitude

Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend Method used

Optional</td><td colspan="2">Select one of the following methods:

<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">The surface area of 2130 habitat when the Directive came into force was estimated to be equal to 72.93 km^2 during the 2007 reporting period (NPWS, 2007); however, in 2013 the Favourable Reference Area was revised to 69.86 km^2 based on the assumption that the previous value was over-estimated (NPWS, 2013).</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 1996 (Crawford et al., 1996) when the first baseline survey was carried out and incorporates updates made by surveys carried out between 1996 and 2024 that are listed in section 3.4.

Favourable Reference Area (FRA) was not determined exactly, but is deemed that the current area is between 2% and 10% smaller than the</td></tr>
</table>

	FRA. FRA is deemed to be greater than the current area, given that some anthropogenic losses have occurred since the Directive came into force and there have also been losses due to natural processes. During the previous reporting period (NPWS, 2019) FRA was deemed to be greater than the 2130 habitat area (80.84 km^2) but no exact value was given. During the current reporting period, 43 2130 sites were visited and 39 of these sites were assessed for Area. These 39 sites represent 26.05 km^2 (33%) of the total area of 2130 habitat recorded in Ireland. This represents a greater proportion of the total national area of 2130 than the 10 sites surveyed by Martin e*t al*. (2017) and one by Devaney *et al.* (2014) during the previous reporting period; however, it is a smaller proportion than the 36 sites surveyed by Delaney *et al.* (2013) which were 46% of the total 2130 area in the Republic of Ireland. Short-term trend for Area was evaluated in comparison to data collected during the Sand Dune Monitoring (SDM) project by Delaney *et al.* (2013). The difference in habitat extent between the area of 76.44 km^2 reported during this reporting period and the figure of 80.84 km^2 reported during the previous reporting period (NPWS, 2019) is due to a number of factors, in part due to genuine changes because of natural fluctuations in this dynamic habitat and improved knowledge/more accurate data. In the 39 sites visited during the current reporting period, there was a genuine change in area due to anthropogenic activities that was assessed resulting in a maximum figure of 0.39 km^2 and a minimum of 0.24 km^2 since 2013. These values were calculated with a comparison of sites previously surveyed by Delaney *et al.* (2013) and Martin e*t al*. (2017). The other loss in area is due to natural fluctuations of the 2130 habitat, improved knowledge/more accurate data and the use of different method. Therefore, short-term trend in Area was deemed to be *decreasing* and the loss in area is less than 1% per year since 2013. The main factors associated with area loss due to anthropogenic activities were conversion to agricultural land, inappropriate grazing leading to encroachment and livestock-assisted erosion, recreational activities and related structures, road network development and encroachment of alien or problematic native species listed in section 7.1 f) of this report. The long-term trend in Area was deemed to be *decreasing* based on the above-mentioned losses and the fact that loss of 2130 habitat due to anthropogenic activities was reported in NPWS (2013).

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***52.28 km²***
		Maximum	***52.28 km²***
	b) Area in not-good condition	**Minimum**	***24.16 km²***
		Maximum	***24.16 km²***
		Minimum	***0 km²***

	c) Area where condition is not known	**Maximum**	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***		
6.7 Typical species Method used *Optional*	The list of typical species is the same as the last reporting period (NPWS, 2019) and was devised by Delaney *et al.* (2013). The Structure and functions criteria used to assess the 2130 habitat are listed in Appendix I of Delaney *et al.* (2013). Typical species: *Agrostis capillaris, Aira praecox, Anthyllis vulneraria, Carex arenaria, Carex flacca, Carex nigra, Carex pilulifera, Cladonia* spp., *Crepis capillaris, Daucus carota, Deschampsia flexuosa, Dicranum scoparium, Erodium cicutarium, Euphrasia officinalis* agg., *Festuca ovina, Festuca rubra, Galium saxatile, Galium verum, Homalothecium lutescens, Hylocomium splendens, Hypnum cupressiforme, Hypochaeris radicata, Linum catharticum, Lotus corniculatus, Luzula campestris, Ononis repens, Peltigera spp., Phleum arenarium, Pilosella officinarum, Plantago lanceolata, Pleurozium schreberi, Poa pratensis, Polygala serpyllifolia, Potentilla erecta, Rhinanthus minor, Rhytidiadelphus squarrosus, Rhytidiadelphus triquetrus, Scleropodium purum, Sedum acre, Syntrichia ruraliformis, Thymus polytrichus, Trifolium repens, Viola chamaedrys, Viola canina, Viola riviniana, Viola tricolor.*		
6.8 Additional information *Optional*	During the current reporting period, 43 2130 sites were visited and 39 of these sites were assessed for Structure and functions, representing 26.05 km^2 (33%) of the total area of 2130 habitat recorded in Ireland. During the last reporting period (NPWS, 2019) the 11 sites surveyed represented 9.54 km^2 (12%) of the total area of the habitat, while during the reporting period before that (NPWS, 2013) 36 sites were		

	assessed by Delaney *et al.* (2013) involving an area of 33.5 km^2 (46% of the total 2130 area). Of the 11 sites assessed for Structure and functions in this reporting period, 68.4% (17.82 km^2) of the area was assessed as being in good condition (*Favourable*) and 31.6% (8.23 km^2) of the area was assessed as being in not-good condition (*Unfavourable*), resulting in an overall conclusion of *Unfavourable-Bad*. This result confirms evidence of the last reporting period (NPWS, 2019) when area in good condition was deemed to be between 52% and 74.9% of the total 2130 area. The approach used to estimate the percentage of the 2130 habitat condition at each site was as follows: If none of the assessment criteria failed at the site level, then 90-100% of 2130 area was considered as being in good condition. If some criteria failed, the exact area in poor condition was calculated using a combination of individual plot data considered as representative of a portion of the habitat area, site-level indicators of monitoring stops, and area affected by pressures recorded on-site and by mapping. While this value was based on the area of the habitat that met the criteria of the Structure and functions assessments, in effect, sites where one to two criteria failed at the site level fell within the 75-89% range and less than 75% of the habitat was found to be in good condition at sites where three or more criteria failed. During the current reporting period, the most frequent criteria to fail the assessment were height of vegetation, lack of positive indicator species and damage due to disturbance. Other failing criteria were presence of negative indicator species, cover of trees and scrub (other than *Juniperus communis*), interference with sediment dynamics and presence of non-native species. During the last two reporting periods (NPWS, 2013, 2019), the most frequent criteria to fail the assessment were damage due to disturbance, height of vegetation, presence of non-native species and lack of positive indicator species. The short-term trend of habitat area in good condition was evaluated on 2013 reporting period findings (NPWS, 2013). During the current reporting period this trend was taken to be *decreasing*. This is due to the fact that for the 39 2130 sites where the Structure and functions were assessed during both this reporting period and the 2013 reporting period, the status of the Structure and functions had decreased at 18 sites, increased at seven sites and remained the same at 14 sites.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	High

PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	High
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	High
PA19 Agricultural activities generating soil pollution	Ongoing	Minority <50%	Medium
PA23 Physical alteration of water bodies (including dams, channels, etc.)	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Medium
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing	Minority <50%	Medium
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Medium
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	Medium
PF04 Development and maintenance of beach areas for tourism and recreation	Ongoing and likely to be in the future	Minority <50%	Medium
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PJ04 Sea-level rise due to climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PM01 Storm or cyclone	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Acer pseudoplatanus, Cupressocyparis* x *Leylandii, Centranthus ruber, Clematis vitalba, Cotoneaster* spp.*, Crocosmia crocosmiiflora, Hippophae rhamnoides, Ligustrum ovalifolium, Lilium* spp.*,*

	Oryctolagus cuniculus, Petasites pyrenaicus, Phormium tenax, Rosa rugosa, Solidago canadensis
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were selected and ranked from the following data: NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats presented in section 7.1 were selected and ranked based on timing (in the past but now suspended due to measures, ongoing, ongoing and likely to be in the future, only in future), scope (proportion of area affected: whole >90%, majority 50 – 90% or minority <50%), influence (high, medium, low). Data were gathered from the sources listed in section 7.3. For the current reporting period, data on pressures were available for 43 2130 sites surveyed by Gallagher *et al.* (in prep.), Rigoni *et al.* (in prep.), NPWS (in prep.). These sites represent 26.05 km^2 (33%) of the total area of 2130 habitat recorded in Ireland. An additional area representing 33% of the 2130 habitat area has been reviewed by aerial imagery in order to investigate the main pressures. In the visited sites, pressures and threats were assessed at site level based on intensity (high, medium or low), effect (negative, neutral or positive), source/occurrence (inside, outside, or both), timing (ongoing, past or future) and area of impact. Seven pressures were determined to have a high impact on the habitat area and condition, notably inappropriate grazing regimes (PA05, PA07, PA08, PA10), sport and leisure activities (PF05) and invasive species (PI01, PI03). Even if these pressures may have a medium impact at site level, the high influence is determined by the coverage of impacted areas and the intensity of the impact. All these pressures were listed as high influence in the last two reports (NPWS, 2013, 2019) except for PF05, which was ranked as medium in the last reporting period (NPWS, 2019). Progress towards reducing high

	impact pressures such as PA07 and PA08 has been made in certain locations since 2013, but they continue in others. Thirteen pressures were retained as medium-importance pressures (including PA25 'Agriculture activities not referred to above', PF07 'Residential and commercial activities and structures generating pollution to surface or ground waters', PJ04 'Sea-level rise due to climate change', PM01 'Storm or cyclone', PM07 'Natural processes without direct or indirect influence from human activities or climate change)'. Pressures and threats noted less frequently and/or that impacted only small areas were deemed to be of low importance, including PF01 Conversion from other land uses to built-up areas , and were omitted from the list in 7.1 owing to a limit on the number of pressures to be listed. The issue of grazing is complex. In the surveyed sites, cessation of grazing, overgrazing (or intensive grazing) and undergrazing (or extensive grazing) nationally have a negative effect on 40% of the 2130 area, undergrazing and extensive grazing have a neutral effect on 15%, and the same figure represents the positive effect of extensive grazing on the habitat area. Undergrazing can lead to scrub encroachment, over-stabilisation of dunes, loss of heterogeneity at a local and landscape level and loss of dune species diversity (Houston, 2008). Conversely, though, overgrazing can lead to bare ground and sand-drift (Houston, 2008). In order to achieve a suitable grazing regime to benefit the 2130 habitat, a balance needs to be maintained between the two effects. These pressures result in tall herbs, spreading of ruderal or invasive species (*Arrhenatherum elatius, Cirsium* spp.*, Rosa spinosissima, Rubus fruticosus, Senecio jacobaea, Urtica dioica*), encroachment, livestock-assisted erosion. Finally, other pressures related to agricultural activities are mostly related to grazing with PA25 noted especially as vehicle tracks and off-road driving. Contrary to the previous reporting periods (NPWS 2013, 2019), the impact represented by PA01 seemed to have decreased in influence and frequency as it was recorded only at four sites. Sport and recreational activities (PF05) together with related practices of infrastructure development (i.e. camping, maintenance of beach areas, deposition of waste and rubbish) continue to impact fixed dunes areas in several sites, with different influences regarding walking, horse riding, golf courses, sports pitches and off-road driving and parking. Other pressures affecting the habitat were spreading of invasive alien species listed in section 7.1 f) and encroachment of native species such as *Pteridium aquilinum, Rubus fruticosus* and *Ulex europaeus*. Finally, fixed dunes are impacted by natural processes such as encroachment and natural erosion listed with codes PM01, PM07 and PJ04 recorded at one site. Climate change is likely to affect the range of 2130 over the coming decades. The short-term predictability of the effect of climate change, and in particular the resultant mean sea level rise and extreme weather events, are unknown but the gradual long-term trend will see an increase in the mean sea level and extreme weather events (EPA, 2017) which will affect the 2130 habitat. One way this could occur is by extreme weather events impacting the

	formation and stabilisation of the foredune communities 2110 and 2120 which develop into the 2130 habitat. All the high-influence pressures presented in section 7.1 are also considered to be the seven main threats in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MB15 Other measures related to forestry practices MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MF08 Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats) MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Conservation measures were selected and ranked based on the frequency of occurrence, using the data gathered during the current reporting period. These data were obtained for 43 2130 sites surveyed by Gallagher *et al*. (in prep.), Rigoni *et al*. (in prep.), and NPWS (in prep.) that represent 33% of the known area of the habitat within Ireland. Measures listed in section 8.6 were observed at 12 sites, with MA03 and MA05 implemented to regulate grazing on 282 ha, removal of small conifer plantation (MB15) on 1 ha, MF03 noted as development of designated paths, fencing and designation of a proper car park to improve 53 ha of 2130 habitat, fencing and dune trap to prevent erosion (MM01) and finally, coastal defences development (MF08). It is to be noted that coastal defences (MF08) may protect and threaten the sand dune system at the same time, preventing erosion in one place while promoting it in another place. Such a measure should be taken carefully. In addition, during the current reporting period, measures on 2130 habitat had been started as part of conservation and restoration projects funded directly by NPWS, as well as under LIFE on Machair and LIFE Insular projects at sites in Donegal, Galway, Mayo and Wexford. In addition, a large site accounting for 12% of the total 2130 area in Ireland was acquired by NPWS for the purposes of conservation in County Kerry. It is too early to predict the impacts of measures undertaken through those projects in this reporting period, but it is anticipated that their impact will become visible over the next reporting period. Conservation measures that are not currently being implemented, but whose implementation would improve the Structure and functions of the habitat and maintain or increase the current surface area, include MA01 'Prevent conversion of natural and semi-natural habitats, and

	habitats of species into agricultural land' to restore habitat converted into improved grassland, MA04 'Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures' and MA05, where not already implemented, to reintroduce or regulate grazing, MA09 'Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production' to prevent nutrient enrichment, MA16 'Other measures related to agricultural practices' to regulate off-road driving, creation of tracks and reduce impact of supplementary feeding, MB01 'Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation', MF01 'Managing the impacts of converting land for construction and development of infrastructure', MF02 'Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities', MF04 'Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures', MF08 'Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities (incl. contamination with litter)' to reduce impact of outdoor activities, camping, caravan parks and associated pollution, MI03 'Management, control or eradication of other invasive alien species', MI04 'Restoration of habitats affected by invasive alien species (incl. of Union concern and others)' and MI05 'Management of problematic native species' to eradicate or prevent spreading of species listed in sections 7.1 f) and 7.4.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current Area is less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *stable* as there is no evidence to suggest further losses will occur. Future prospects of Area are therefore *Poor*. Short-term trend direction of Structure and functions is assessed as *decreasing* for habitat that is in good condition.	

	Current Structure and functions are assessed as *Unfavourable-Bad* as >25% of the habitat is not in good condition. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. Future trend of Structure and functions is assessed as *stable* as no change in Structure and functions is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Structure and functions are therefore *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Unfavourable-Inadequate*, as it was in the previous reporting period. The Conservation Status of Structure and functions and Future prospects are *Unfavourable-Bad*, as they were in the previous reporting period.	

	The Overall assessment of Conservation Status is *Unfavourable-Bad*. This is the same as the previous reporting period. The status of *Unfavourable-Bad* during the current reporting period is due to the fact that <25% of the area of 2130 habitat has been assessed as having unfavourable Structure and functions. Trend in Overall assessment of Conservation Status is *stable*, as it was in the previous reporting period.

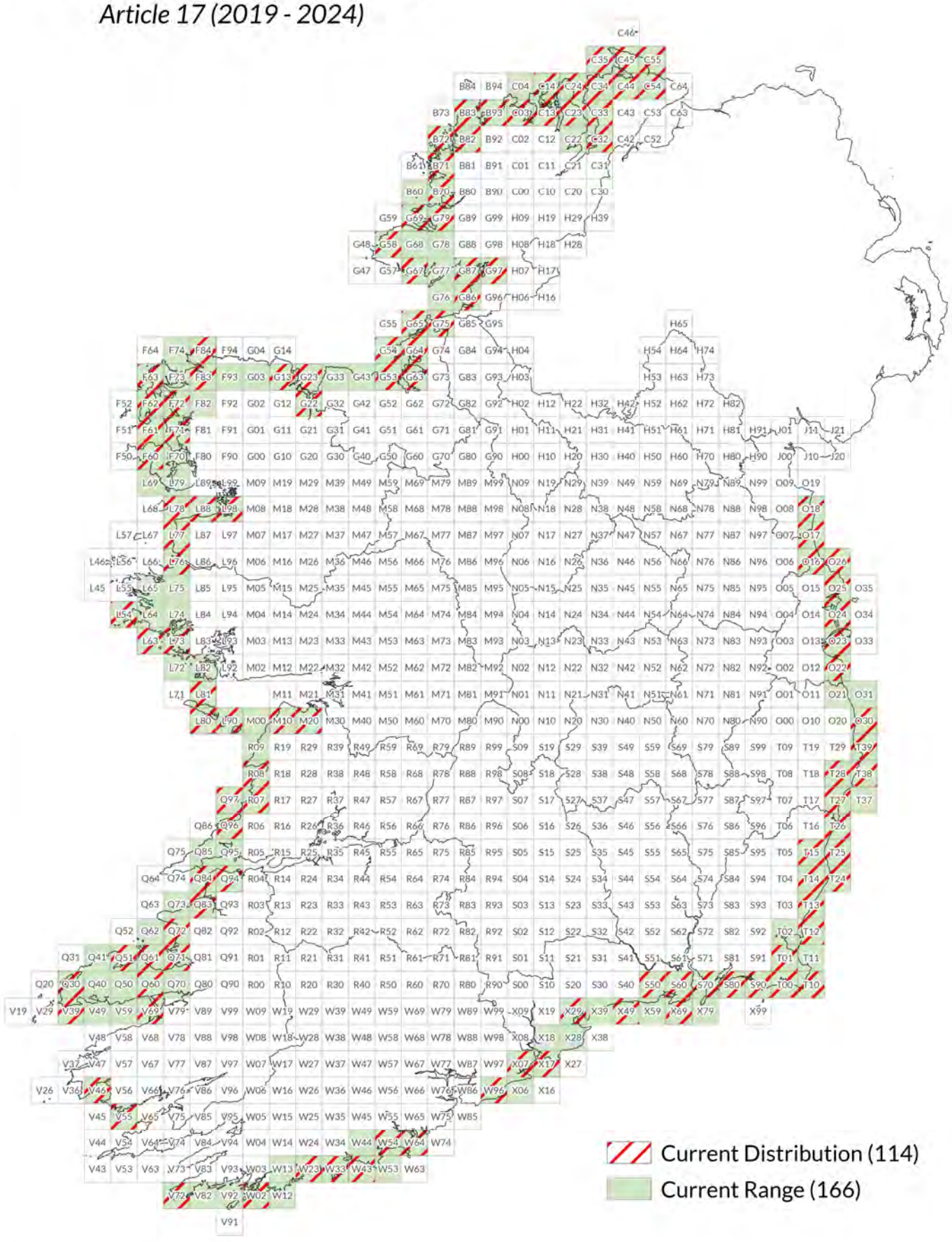
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***63.42 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	

11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefiles. The area given in section 11.1 is the total area of 2130 habitat in SACs in the country, including some SACs where 2130 is not listed as a qualifying interest (QI). The area of 2130 within the Natura 2000 network where it is listed as a QI is 60.62 km^2. Anthropogenic losses reported in the 2130 sites assessed for Area during the current reporting period were in part from within the SAC network. Direction of short-term trend of habitat area within the network has been assessed as *decreasing* due to these losses. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 2130 habitat nationally, as almost all areas of 2130 habitat surveyed during the last reporting periods were within the SAC network. The surface area of 2130 habitat within the N2000 network has decreased from the previous reporting period; this is due to anthropogenic losses and improved knowledge/more accurate data as per habitat area at national level (see section 5.17).

12 Complementary information *N/A*

Fixed dunes (grey dunes)* (2130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2140 Decalcified fixed dunes with *Empetrum nigrum****
1.2i Habitat short name	***Empetrum* dunes**
1.3i Habitat description	2140 Decalcified fixed dunes with *Empetrum nigrum* are either found on the landward edge of dune systems where the surface layers of sand have been leached of their calcium content, or where sand has become fixed over siliceous rock. Typical species include *Empetrum nigrum, Calluna vulgaris, Thymus polytrichus, Lotus corniculatus, Carex panicea*, and the sand binding species *Carex arenaria* and *Ammophila arenaria*. 2140 is distinguished from 2150 by the presence of *Empetrum nigrum*, which is usually the most frequent dwarf shrub, within a more open dune heath community.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2018-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The most recent survey involving 2140 sites took place from 2022 to 2024 (Rigoni *et al.*, in prep.), however most of those locations were surveyed based on a desktop review of aerial imagery or were below the minimum mapping area, so no changes to polygon habitat distribution have been recorded. All the polygons representing 2140 locations contained points mapped by Martin (2018a, b) with a higher accuracy and more information than the Rigoni *et al.* (in prep.) polygons. Martin (2018a, b) surveyed all the 2140 areas that were used to compile the distribution map for the 2013 reporting period (NPWS, 2013) and that survey was employed to compile the distribution map during the last reporting period (NPWS, 2019). The distribution map of the current reporting period therefore originated from the points surveyed by Martin (2018a, b). A certainty rating system was applied to all data that informed the distribution map, this system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1, the lowest. All points have been assigned

	a certainty equal to 3, because data were recorded during a complete survey less than 10 years ago.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic,*** *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Reference to first report of the habitat: NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps Volume 2. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.
3.4 Sources of information	CEC (Commission of the European Communities) (2013) Interpretation manual of European Union habitats. EUR 28. European Commission, DG Environment. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals*, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien & F. McGovern. EPA, Wexford. Martin, J.R. (2018a) SDMN17_2140_2150_points_2018.shp. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Martin, J.R. (2018b) SDMN17_Coastal_habitats_database_2018.mdb. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Martin, J.R. (2018c) SDMN17_AR1719_pressures_assessment. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in-Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland.

	Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2007) Coastal Monitoring Project 2004-2006: A report prepared for the National Parks and Wildlife Service, Research Branch Contract Reference D/C/79 (Unpublished).

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2011-2023***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2004-2023***	

4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 500 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	Following NPWS (2007) the habitat range when the Directive came into force was estimated to be equal to 300 km² (three 10x10 km grid cells x 100 km^2), based on the coastal habitat survey (Ryle *et al.*, 2007) during that reporting period.	
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 2140 habitat. Short-term trend in Range was estimated based on data from the current reporting period and the 2013 reporting period (NPWS, 2013). No change in range has been recorded, therefore short-term trend is assessed as *stable*. The Favourable Reference Range (FRR) was the same as the last reporting period (NPWS, 2019). The FRR is the current range, reported in section 4.1, equal to 500 km^2. There is no evidence of loss of range	

	since the Directive came into force and the geographic spread is considered sufficient for the long-term survival of the habitat. It is to be noted that a change in range might have occurred since the last reporting period but there is no evidence of that due to the fact that no field survey has been conducted during the current reporting period. Nevertheless, based on an aerial imagery review there is no evidence of loss due to anthropogenic activities that could have changed the assessment of the Range and its trends.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2018-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0002 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
5.6 Short-term trend Period	***2011-2023***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	

5.9 Short-term trend **Magnitude** **Type of estimate**	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*	***2004-2023***	
5.12 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend **Method used** *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	

	☐ *Other (Elaborate in Additional information 5.17)*
5.16 Surface area when Directive came into force *Optional*	Following NPWS (2007), the habitat area when the Directive came into force was estimated to be equal to 0.05 km², based on the area of dune heath recorded during that reporting period, plus the estimated loss of area since the Habitats Directive came into force. Nevertheless, since 2007 that value has been revised several times due to misidentification of 2140 habitat, improved knowledge and more accurate data. Note that there is no evidence of this loss since the Directive came into force.
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 2007 (data presented in NPWS, 2007). These data were updated for 2019 report by Martin (2018a, b) and desktop reviewed during the current reporting period (Rigoni et al., in prep.). Favourable Reference Area (FRA) was not determined exactly, but is estimated to be approximately equal to the current area. No anthropogenic losses have been recorded since the Directive came into force. During the current reporting period two sites where the habitat had been recorded previously, Kincaslough (SAC 001141) and Maghera (SAC 000190), were revisited but no new habitat mapping was carried out; Sheskinmore (SAC 000197) was not part of the field survey and two other areas inside Gweedore Bay and Islands SAC (001141) were desktop reviewed. There is no evidence of losses in area based on the aerial imagery review. All the above-mentioned sites were visited by Martin (2018a, b) during the previous reporting period (NPWS, 2019) resulting in a total area of surveyed 2140 habitat equal to 0.0002 km^2 (200 m^2). The short-term trend was deemed to be *stable* as no anthropogenic losses were recorded within the current reporting period or during the previous reporting periods (NPWS, 2007; 2013; 2019). Long-term trend in Area was deemed to be *stable* with no anthropogenic losses recorded during the current or previous reporting period (NPWS, 2019). However, it is difficult to assess the long-term trend as the habitat was not defined or comprehensively surveyed until 2010. It is to be noted that Area was assessed through a desk study rather than a field survey during the current reporting period. Nevertheless, based on aerial imagery review there is no evidence of loss due to anthropogenic activities that could have changed the assessment of the Area and its trends.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.0002 km²***
		Maximum	***0.0002 km²***
		Minimum	***0 km²***

	b) Area in not-good condition	**Maximum**	***0 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2011-2023***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	No change in methodology or in the list of typical species occurred since Martin survey (2018a, b). The typical plant species list for the 2140 habitat is: *Empetrum nigrum, Calluna vulgaris, Ammophila arenaria, Carex arenaria, Calliergonella cuspidata, Carex panicea, Holcus lanatus, Koeleria macrantha, Lotus corniculatus, Pilosella officinarum, Plantago lanceolata, Plantago maritima, Scleropodium purum, Thymus polytrichus* and *Trifolium repens.*		
6.8 Additional information *Optional*	During the current reporting period, 2140 sites were not assessed for Structure and functions as no monitoring plots has been recorded. All the 2140 locations were surveyed by Martin (2018a, b) during the last reporting period, with three monitoring plots recorded across two out of five sites (NPWS, 2019). In 2018 the entire 2140 area was in good condition. Structure and functions were therefore assessed at national level by expert judgment based on the complete survey conducted by Martin (2018a, b) giving a result of 100% of the habitat being in good condition. For the same reason, short-term trend was assessed by expert judgment during the current reporting period. During the 2013 reporting period, 90% of the area was assessed as being in good condition, resulting in a Structure and functions assessment of *Unfavourable* based on expert judgment without listing specific reasons for unfavourable habitat area (NPWS, 2013; 2019). Due to		

	that fact and for the same reason explained for the area condition, short-term trend was assessed as *stable* during the current reporting period.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Majority 50-90%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Majority 50-90%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Majority 50-90%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were selected and ranked from the following data: NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
7.4 Additional information *Optional*	The pressures and threats presented in section 7.1 were selected and ranked based on timing (in the past but now suspended due to measures, ongoing, ongoing and likely to be in the future, only in future), scope (proportion of area affected: whole >90%, majority 50-90% or minority <50%), influence (high, medium, low). Data were gathered from the source listed in section 7.3. For the current reporting period, pressures were mostly investigated by desktop review on aerial imagery and no pressure was identified. Kincaslough (SAC 001141) and Maghera (SAC 000190) were visited in 2022 but 2140 habitat was not fully surveyed. Nevertheless, across the 2140 area at Kincaslough no pressure was detected, whilst at Maghera the 2140 location was surrounded by bracken (*Pteridium aquilinum*) and scrub encroachment affecting the majority of the dune heath area. Therefore, undergrazing and encroachment noted by Martin (2018c) and listed as main pressures during the previous reporting period (NPWS, 2019) reasonably continue to impact and threaten 2140 habitat. In addition, PF05 'Sports, tourism and leisure activities' was mentioned as the main pressure by Martin (2018c).

	Other pressures listed by Martin (2018c) include PI02 'Other invasive alien species (other than species of Union concern)', recorded as neutral and PH08 'Other human intrusions and disturbance not mentioned above', used to record accidental burning with a negligible effect. Based on the available information, during the current reporting period PA08 'Extensive grazing or undergrazing by livestock', PF05 and PI03 'Problematic native species' were identified as medium-influence pressure and threats impacting the majority of the 2140 habitat. Climate change has not been added as an impact but it is likely to affect the range of 2140 over the coming decades. The short-term predictability of the effect of climate change, and in particular the resultant mean sea level rise and extreme weather events, is unknown but the gradual long-term trend will see an increase in mean sea level and extreme weather (EPA, 2017) which will affect the 2140 habitat.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MI05 Management of problematic native species
8.7 Additional information *Optional*	Conservation measures were selected and ranked based on the frequency of occurrence. As per pressures and threats listed in section 7 of this report, conservation measures were identified based on pressures observed in sites where 2140 was recorded during the last reporting period (NPWS, 2019) plus data collected by Martin (2018a, b, c). MA04 'Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures' and MI05 'Management of problematic native species' are the main measures identified to address the impact of undergrazing and bracken (*Pteridium aquilinum*) encroachment. The main purpose is to improve the habitat condition. During the last reporting period (NPWS, 2019) the maintenance of extensive agricultural practices undertaken through the Department of Agriculture's Green, Low-Carbon, Agri-Environment Scheme (GLAS) was listed as a measure taken. More recently, ACRES cooperation projects have been organizing a management plan for an area that includes a portion of 2140 habitat, and the effects of this measure will become apparent over the next reporting period. Finally, a grazing regime is in place at Sheskinmore and Gweedore.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*.	

	Future trend of Range is assessed as *Stable*, as no change in range is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is approximately equal to the Favourable Reference Area. No significant changes in distribution pattern occurred during the current reporting period. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable* as there have been no reported losses in area for the 2140 habitat over the last two reporting periods and no change in Area is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *stable* for habitat that is in good condition. Current Structure and functions are assessed as *Favourable* as 100% of the habitat is in good condition. Conservation status of Structure and functions is therefore *Favourable*. Future trend of Structure and functions is assessed as *stable*. Future prospects of Structure and functions are *Good*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*

	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range, Area, Structure and functions and Future prospects are *Favourable* in this reporting period, as they were in the previous reporting period. The Overall Conservation Status is assessed as *Favourable*. This is the same as the previous reporting period. Trend in Overall Conservation Status is assessed as *stable*. This is the same as the previous reporting period.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0002 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution points and the SAC shapefile. The area given in section 11.1 is the total area of 2140 habitat in SACs in the country and the 2140 habitat is listed as a qualifying interest (QI) within the three SACs where it was recorded. The short-term trend of the habitat area in good condition within the SAC network is taken to be *stable*, with the same trend as the 2140 habitat nationally (see section 6.4 and 6.8) as all areas of 2140 habitat surveyed during the last two reporting periods were within the SAC network.

12 Complementary information *N/A*

Empetrum dunes* (2140)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2150 Atlantic decalcified fixed dunes *(Calluno-Ulicetea)****
1.2i Habitat short name	**Dune heath**
1.3i Habitat description	2150 Atlantic decalcified fixed dunes *(Calluno--Ulicetea)* are most often found on the landward edge of dune systems where the surface layers of sand have been leached of their calcium content, or where sand has become fixed over siliceous rock. Typical species include *Calluna vulgaris, Lotus corniculatus, Anthoxanthum odoratum, Viola riviniana* and the sand binding species *Carex arenaria* and *Ammophila arenaria.*

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2018-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2150 polygons and points mapped by Martin (2018a, b) presented during the previous reporting period by NPWS (2019), and 2150 polygons mapped during the monitoring projects Rigoni *et al.* (in prep.) and NPWS (in prep.) in the period 2022-2024. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1, the lowest. Given that data collected by Rigoni *et al.* (in prep.) and NPWS (in prep.) were based on a comprehensive field survey in recent years, and Martin (2018a, b) data had already been employed for the 2019 reporting period, all were judged to be good-quality datasets and were assigned a high certainty of 3. Four polygons surveyed by Ryle *et al.* (2009) were assigned a certainty of 0 and therefore excluded from the distribution shapefile as per 2019 reporting period.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Reference to first report of the habitat: NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps Volume 2. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.
3.4 Sources of information	Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals*, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010--2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford. Martin, J.R., Daly, O.H. & Devaney F.M. (2017) Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites. Volume 1: Main report. *Irish Wildlife Manuals,* No. 98. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. Martin, J.R. (2018a) SDMN17_SDM_update_2018.shp. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Martin, J.R. (2018b) SDMN17_2140_2150_points_2018.shp. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Martin, J.R. (2018c) SDMN17_Coastal_habitats_database_2018.mdb. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Martin, J.R. (2018d) SDMN17_AR1719_pressures_assessment. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2007) Coastal Monitoring Project 2004-2006: A report prepared for the National Parks and Wildlife Service, Research Branch Contract Reference D/C/79 (Unpublished).

	NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci & G. Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2011-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2004-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km²*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	

4.13 Range when Directive came into force *Optional*	According to NPWS (2007), the habitat range when the Directive came into force was estimated to be equal to 1,500 km² (15 grid cells x 100 km^2), based on the dune heath surveyed during that reporting period. Nevertheless, since 2007 dune heath area has been revised several times due to improved knowledge, more accurate data and changes in habitat definition.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 2150 habitat. Short-term trend was estimated based on data from the current reporting period and the 2013 reporting period (NPWS, 2013). The fact that the 2150 habitat was recorded at Garter Hill, inside the Glenamoy Bog Complex (SAC 000500) during the current reporting period led to an increase in the range of one 10x10 km grid cell. This change in the range is most probably due to improved knowledge or more accurate data and the short-term trend is assessed as *stable*. The Favourable Reference Range (FRR) has been increased since the last reporting period (NPWS, 2019) to reflect the improved level of knowledge. The FRR is the current range, reported in section 4.1 as 500 km^2. There is no evidence of loss of range since the Directive came into force and the geographic spread is considered sufficient for the long-term survival of the habitat.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2018-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.313 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown*	

	f) yes, due to other reasons	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2011-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2004-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) 0.313 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2">Following NPWS (2007), the habitat area when the Directive came into force was estimated to be equal to 1 km², based on the area of dune heath recorded during that reporting period, plus the estimated loss of area since the Habitats Directive came into force. However, since 2007 that value has been revised several times due to improved knowledge, more accurate data and changes in habitat definition. Based on improved knowledge, the surface area when the Directive came into force could be at least equal to the 2025 Favourable Reference Area plus potential losses of area of unknown extent.</td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 2007 (data presented in NPWS, 2007). These data were updated for the 2019 report by Martin (2018a, b) and during the current reporting period.

Favourable Reference Area (FRA) was estimated to be equal to 0.313 km² based on the value estimated during the previous reporting cycle (NPWS, 2019) plus a new area of dune heath found at Garter Hill, inside the Glenamoy Bog Complex (SAC 000500), during the current reporting period. No anthropogenic losses have been recorded since the Directive came into force. However, as no comprehensive survey for the habitat was undertaken until 2010 it is unclear if grazing pressure that took place before this date may have reduced the area of the dune heath.

During the current reporting period 2150 was recorded in three sites previously surveyed by Martin (2018a, b), specifically Aghleam (SAC 000470), Brittas Bay (SAC 000729) and Maghera (SAC 000190), while dune heath in Sheskinmore (SAC 000197) and Lough Nagreany (SAC</td></tr>
</table>

	000164) were not revisited. In addition, a new area of dune heath was recorded at Garter Hill (SAC 000500) in a transitional zone between peatlands and sand dune system. The total 2150 area mapped between 2018 and 2024 is 0.313 km^2. The short-term trend and long-term trend were deemed to be *stable* as no anthropogenic losses were recorded since the first reporting round of the habitat (NPWS, 2019). However, it is difficult to assess the long-term trend as the habitat was not defined or comprehensively surveyed until 2010. The difference in habitat extent between the area of 0.205 km^2 reported during the previous reporting period (NPWS, 2019) and the figure of 0.313 km^2 of the current reporting period is due to the identification of a new dune heath area in Garter Hill (SAC 000500) and improved knowledge/more accurate data. Changes in mapping observed at Aghleam (SAC 000470), Brittas Bay (SAC 000729) and Maghera (SAC 000190) are due to more accurate data and to different methods for establishing the boundary between dune heath and other sand dune habitats. During the previous reporting period, 2150 was clearly defined as areas of sand dune habitat with a minimum of 25% cover of *Calluna vulgaris* and/or *Erica* species (NPWS, 2019) and dune heath was accurately mapped by Martin (2018a, b) allowing the estimation of the habitat extent via a complete survey, avoiding extrapolation. During the current reporting period, habitat definition and methodology were not changed and some dune heath areas were resurveyed.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.239 km²***
		Maximum	***0.270 km²***
	b) Area in not-good condition	**Minimum**	***0.043 km²***
		Maximum	***0.074 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2011-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as the last reporting period (NPWS, 2019). Typical species: *Calluna vulgaris, Ammophila arenaria, Anthoxanthum odoratum, Carex arenaria, Danthonia decumbens, Festuca ovina, Festuca rubra, Holcus lanatus, Hylocomium splendens, Hypericum pulchrum, Lotus corniculatus, Potentilla erecta, Rhytidiadelphus triquetrus, Rosa spinosissima, Scleropodium purum, Succisa pratensis,* and *Viola riviniana.*
6.8 Additional information *Optional*	During the current reporting period, four 2150 sites were visited and assessed for Structure and functions. Three sites (Aghleam, Brittas Bay and Maghera) were surveyed and assessed for Structure and functions during the previous reporting period by Martin (2018c) whilst in another site (Garter Hill), 2150 was recorded for the first time in 2024 by Rigoni *et al.* (in prep.). Dune heath was recorded in two sites (Sheskinmore and Lough Nagreany) during the previous reporting period which were not revisited or assessed for Structure and functions since 2018. The four sites assessed for Structure and functions represent 0.272 km^2 (87%) of the total area of 2150 habitat recorded in Ireland. One site (Aghleam) was *Favourable*, two sites (Garter Hill and Maghera) were *Unfavourable-Inadequate* and the last site (Brittas Bay) was *Unfavourable-Bad*. During the previous reporting period Martin (2018c) assessed two sites as *Favourable* (Maghera and Sheskinmore) and three as *Unfavourable-Inadequate* (Aghleam, Brittas Bay and Lough Nagreany). In total, 76.5% of the 0.272 km^2 of 2150 habitat that was surveyed during the current reporting period was in good condition (favourable) and 23.5% was not in good condition (unfavourable). During the previous reporting period, the entire 2150 area was surveyed and assessed and 86.4% of the 0.205 km^2 of 2150 habitat was in good condition (favourable) and 13.6% was not in good condition (unfavourable). Given that some sites were not revisited during the current reporting period, even though a large portion of the dune heath area was surveyed it was deemed advisable to assign minimum and maximum values to evaluate area condition based on the percentages discussed above. Based on expert opinion it was decided that 76.5% is likely to represent a minimum figure for the percentage of the national area of 2150 in good condition and 86.4% represents a maximum figure. Therefore, the two figures were utilised for the minimum and maximum area figures presented in section 6.1. The approach used to estimate the percentage of the 2150 habitat condition at each site was as follows: If none of the assessment criteria failed at the site level, then none of the 2150 area was classified as

	unfavourable and 90% to 100% of 2150 area was considered as being in good condition; if one to two criteria failed at the site level, then a site-based assessment was made that assigned the proportion of the 2150 area with unfavourable Structure and functions, giving a value from 25% to 89%; finally if three or more criteria failed at the site level, then a site-based assessment was made that assigned the proportion of the 2150 area with unfavourable Structure and functions giving a value from 0% to 24%. The exact value between minimum and maximum was given considering survey plot results as representative of a portion of the habitat area and the pressures affecting it. At Aghleam, 90% of the 2150 area was assigned as having *Favourable* Structure and functions even though *Calluna vulgaris* in mature growth phase was not completely developed. At Brittas Bay, 100% of the 2150 area was assigned as having *Unfavourable* Structure and functions due to a high incidence of scrub, notably Gorse (*Ulex europaeus*), and Bracken (*Pteridium aquilinum*) encroachment throughout the habitat, including a cover score of the latter of 30% within one monitoring stop and a cover from 36% to 100% of trees and scrub within all the monitoring stops. At Garter Hill and Maghera, 75% of the dune heath area was assigned as having *Unfavourable* Structure and functions, the first because of the absence of *Calluna vulgaris* in mature growth phase, and the second due to heavy Bracken (*Pteridium aquilinum*), Bramble (*Rubus fruticosus),* Hazel (*Corylus avellana*) and rose (*Rosa* spp.) encroachment recorded at every monitoring stop, and overall covering 40% of the 2150 area. During the 2013 reporting period, 85% of the 2150 habitat was assessed as *Favourable* by expert judgment. Structure and functions were not assessed at site level and no specific reasons were listed for 15% of the habitat being *Unfavourable* (NPWS, 2013). During the current reporting period, area in good condition was estimated to be between 76.5% and 86.3% of the 2150 area, resulting in an average value of 81.4%. Potentially the current area in good condition could be greater than or equal to the 85% figure of NPWS (2013). Although 6 years is considered to be a less reliable time frame to determine a directional change than the recommended 12 years, it is to be noted that the Structure and functions assessment of three sites surveyed in 2018 and 2022-2023 (Aghleam, Brittas bay and Maghera) seems to indicate a *decreasing* trend: Aghleam was the only site that got better from *Unfavourable-Inadequate* (Martin, 2018c) to *Favourable* (Rigoni *et al*., in prep.) whilst Brittas Bay deteriorated from *Unfavourable-Inadequate* (Martin, 2018c) to *Unfavourable-Bad* (Rigoni *et al.*, in prep.) and Maghera from *Favourable* (Martin, 2018c) to *Unfavourable-inadequate* (Rigoni *et al*., in prep.). On that basis, the short-term trend of habitat area in good condition was taken to be *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were selected and ranked from the following data: NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E., (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats presented in section 7.1 were selected and ranked based on timing (in the past but now suspended due to measures, ongoing, ongoing and likely to be in the future, only in future), scope (proportion of area affected: whole >90%, majority 50-90% or minority <50%), influence (high, medium, low). Data were gathered from the source listed in section 7.3. For the current reporting period, data on pressures were available for four 2150 sites surveyed by Rigoni *et al*. (in prep.) and NPWS (in prep.),

	which represent 87% of the known area of the habitat within Ireland. For that reason, the method used to assess pressures and threats was based mainly on extrapolation from a limited amount of data as stated in section 7.2. Pressures and threats were assessed at site level based on intensity (high, medium or low), effect (negative, neutral or positive), source/occurrence (inside, outside, or both), timing (ongoing, past or future) and area of impact. Two pressures, PA08 'Extensive grazing or undergrazing by livestock' and PI03 'Problematic native species', were determined to have a high influence on the habitat area or condition, both related to grazing. The issue of grazing is complex because undergrazing can lead to scrub encroachment, over-stabilisation of dunes, loss of heterogeneity at a local and landscape level and loss of dune species diversity, whilst overgrazing can lead to bare ground and sand-drift. In order to achieve a suitable grazing regime a balance needs to be maintained between the two effects (NPWS, 2019). PA08 'Extensive grazing or undergrazing by livestock' at Brittas Bay was identified as the main cause for scrub and Bracken (*Pteridium aquilinum*) encroachment NPWS (in prep.), whilst at Maghera the pressure has been recorded as a positive influence impact because of the benefits of the balance in grazing regime. However, at Maghera PI03 'Problematic native species', notably Bracken and Hazel (*Corylus avellana*) encroachment has been recorded as a high-influence pressure impacting 30% of the dune heath area on-site (NPWS, in prep.). In that context, PA08 and PI03 negatively influenced respectively 0.5% and 15% of the area surveyed during the current reporting period. Accidental fire (PH04) was noted at Brittas Bay during a site visit subsequent to the monitoring survey (NPWS, in prep.). The fire was observed within the area that was considered to have been undergrazed. This was considered to have a medium impact because some signs of regeneration were observed at this site subsequently, indicating that this is an intense temporary impact over a small area (<20 m^2) rather than permanent loss. Accidental fire associated with recreation activity is an ongoing threat at coastal sites and may be exacerbated by changing rainfall patterns and undergrazing. Encroachment of *Rosa* spp, Bramble and willows (*Salix* spp.) has been recorded at Maghera and during the current reporting period it has been assessed as a medium-influence pressure because it affected 10% of the dune heath of the site, threatening Structure and functions of the habitat. Pressures and threats noted less frequently and/or that impacted only small areas were deemed to be of low importance. Low-importance pressures recorded during the current reporting period included PA25 'Agriculture activities not referred to above' (presence of vehicle tracks for agriculture) and PF05 'Sports, tourism and leisure activities'. During the previous reporting period (NPWS, 2019), A06 'Abandonment of grassland management (e.g. cessation of grazing or of mowing)', F07 'Sports, tourism and leisure activities' and I04 'Problematic native species' (respectively corresponding to 2019-2024 pressure/threat codes PA08, PF05 and PI03) were identified as pressures and threats affecting 2150 habitat.

	Climate change has not been added as an impact but it is likely to affect the range of 2150 over the coming decades. The short-term predictability of the effect of climate change, and in particular the resultant mean sea level rise and extreme weather events, is unknown but the gradual long-term trend will see an increase in mean sea level and extreme weather (EPA, 2017) which will affect the 2150 habitat. The pressures presented in section 7.1 are also considered to be the main threats in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MI05 Management of problematic native species
8.7 Additional information *Optional*	Conservation measures were selected and ranked based on the frequency of occurrence, using the data gathered during the current reporting period. These data were obtained for four 2150 sites surveyed by Rigoni *et al.* (in prep.) and NPWS (in prep.) that represent 87% of the known area of the habitat within Ireland. MA04 'Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures' and MI05 'Management of problematic native species' have been implemented at Brittas Bay during the current reporting period in order to regulate grazing and control encroachment and spreading of Bracken. It should be noted that these measures may provide some protection against accidental fires by reducing the volume of flammable material available. Plans are in place to increase the area where these measures are implemented in Brittas Bay. On the west coast, the ACRES agri-environment scheme is now in place. This may help the delivery of improved conservation management for 2150, but this scheme is at a very early stage of implementation and the outcomes of ACRES will be observed over the next reporting period. Other measures related to low-influence pressures affecting small portion of habitat area are MA16 'Other measures related to agricultural practices', related to the presence of vehicle tracks, and MI03 'Management, control or eradication of other invasive alien species' to control Sycamore (*Acer pseudoplatanus*) spreading at Brittas Bay.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*.	

	Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is greater than the Favourable Reference Area. No significant changes in distribution pattern occurred during the current reporting period. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable* as there have been no reported losses in area for the 2150 habitat over the last two reporting periods and no change in area is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *decreasing* for area of the habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable-Inadequate* as >75% but <90% of the habitat is in good condition (area not in good condition estimated to be 13.6-23.5%). Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *stable* as no change in structure and functions is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*

	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range and Area are *Favourable* in this reporting period, as they were in the previous reporting period. The Conservation Status of Structure and functions and Future prospects are *Unfavourable-Inadequate*, as they were in the previous reporting period. The Overall assessment of Conservation Status is *Unfavourable-Inadequate*. This is the same as the previous reporting period. The status of *Unfavourable-Inadequate* is due to 13.6%-23.5% of the 2150 habitat not being in good condition. Trend in Overall assessment of Conservation Status is assessed as *deteriorating*, whereas it was assessed as *stable* during the previous reporting period. The change in status is due to the Structure and functions *decreasing* trend.	

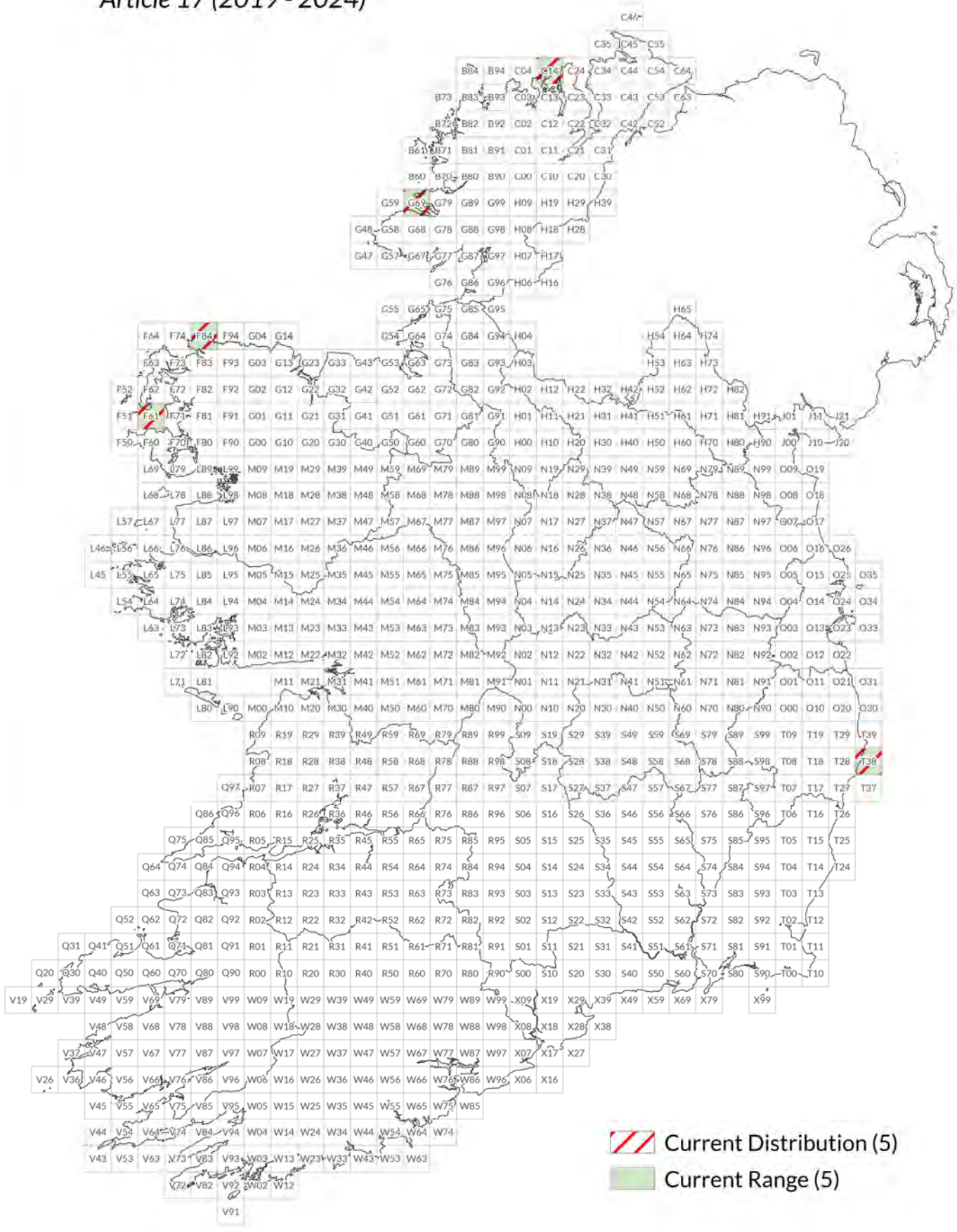
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.313 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefile. A small area of 2150 habitat is located outside the SAC 000470 but due to its extent of 15m^2 it is deemed negligible. The area given in section 11.1 is the total area of 2150 habitat in SACs in the country and the 2150 habitat is listed as a qualifying interest (QI) within five SACs where it was recorded. 2150 habitat is not listed as a qualifying interest (QI) at Garter Hill (Glenamoy Bog Complex SAC 000500) because it was recorded for the first time during the current reporting period. The short-term trend of the habitat area in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 2150 habitat nationally (see section 6.4 and 6.8) as all areas of 2150 habitat surveyed during the last two reporting periods were within the SAC network.

12 Complementary information *N/A*

Dune heath* (2150)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**2170 Dunes with Creeping Willow (*Salix repens* spp. *argentea*)**
1.2i Habitat short name	**Dunes with Creeping Willow**
1.3i Habitat description	2170 Dunes with Creeping Willow (*Salix repens* spp. *argentea*) are typically found either within dune slacks on sandy hummocks, or on the sides of dune ridges adjacent to slacks. This habitat represents the transitional zone between arid dune ridges and wet conditions in dune slacks. Although Dunes with Creeping Willow can be occasionally inundated, to qualify as Dunes with Creeping Willow, the area should only rarely and briefly flood. Creeping Willow is dominant and often forms a dense ground cover. There should be an absence of moisture-loving species which are typically found in dune slacks. Species associated with Dunes with Creeping Willow include *Carex flacca* (Glaucous Sedge), *Carex arenaria* (Sand Sedge), *Agrostis stolonifera* (Creeping Bent), *Pilosella officinarum* (Mouse-ear Hawkweed), *Euphrasia officinalis* agg. (eyebrights), and *Lotus corniculatus* (Common Bird's-foot-trefoil).

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1996-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2170 polygons mapped by the Coastal Habitat Monitoring Project surveys (Gallagher *et al.,* in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.), Woodrow & Denyer (2014), Delaney *et al.* (2013), NPWS (2012), Fingal County Council (2010) and Ryle *et al.* (2009). All of the datasets listed above which were published prior to 2019 were also used to compile the distribution map for the last reporting period (NPWS, 2019). However, some polygons from these datasets may not have been included in determining the current distribution of 2170 in cases where the data has been superseded by a more recent survey.

	A certainty rating system was applied to each polygon that informed the distribution map. The rating system uses a range from 1 to 3, with 3 representing the highest level of certainty and 1 representing the lowest level of certainty. All polygons that were subject to a walkover field survey in 2022/2023 as part of the Coastal Habitats Monitoring Projects (Rigoni *et al*., in prep.; Gallagher *et al*., in prep.; NPWS, in prep.) were assigned a certainty level of 3. Any polygons which were only viewed from a distance in the field, or subject to desktop survey as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 2. Data from Woodrow & Denyer (2014) and Delaney *et al.* (2013) were assigned a certainty level of 3 in the previous round of reporting. However, given the age of these data (now 10 years or older), a certainty level of 2 was assigned for the current round of reporting. Data from Ryle *et al*. (2009) was assigned a certainty level of 2 in the last round of reporting. As these data are now nearly 20 years old, a certainty level of 1 was assigned in the current reporting period. Data from NPWS (2012) were assigned a certainty level of 2 in the previous reporting period, but as these data are now over 20 years they were assigned a certainty level of 1 in the current reporting period. Data from Fingal County Council (2010) were assigned a certainty rating of 1 in the previous reporting period, which was retained in the current reporting period. All polygons with a certainty rating of 1 or 2 were then individually assessed to confirm their certainty rating. All polygons with certainty 1 to 3 were used to map the distribution of the 2170 habitat. It should be noted that as some polygons are now more than 20 years old, follow up surveys should be undertaken to confirm the presence of 2170 habitat at these locations. During the previous reporting period an additional data source which contributed to the creation of the distribution map of 2170 but was excluded in this round of reporting was Martin *et al.* (2017). This dataset was superseded by the Coastal Habitat Monitoring Project data in the current round of reporting, as these sites were revisited and field surveyed in 2022/2023.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals*, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

	Fingal County Council (2010) Shapefile supplied by Fingal for NPWS. Dublin. Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2012) Management Planning Support Unit Maps 2405_imap95. CPU_Habitats_March_2012.shp. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Woodrow, W. & Denyer, J. (2014) NIS: The use of designated machair within the West of Ardara / Maas Road SAC and Skeskinmore Lough SPA for the annual Ardara agricultural show. Unpublished report for National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***3,100 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***

	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	*stable /* ***increasing*** */ decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) In km^2</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: <u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">During the previous reporting period (NPWS 2019), the Favourable Reference Range was set as 3,000 km^2 (the range at the time) as there was no evidence of loss of range since the Directive came into force and the geographic spread was considered sufficient for the long-term survival of the habitat. In the current reporting period there was an increase in the range of 2170 habitat, despite the loss of a small area of this habitat due to anthropogenic activity. The increase in range was due to the mapping of a mosaic of 2130 Fixed dune habitat and 2170 habitat at Castlegregory Maharees, which had previously solely been mapped as 2130 Fixed dune habitat. It is felt that this additional area of 2170 represents a genuine expansion of the habitat at this site, which hosts one of the most extensive areas of 2170 habitat in Ireland. There was no evidence that this increase represented recovery or restoration of the habitat, and it was more likely to reflect weather patterns in the months preceding the monitoring survey. If the conditions change and the water table drops in future, the range is likely to return to its former extent. Expansion of 2170 can also occur due to desiccation of 2190 Dune slacks. Such measurable increases or decreases in extent are a typical feature of dynamic coastal habitats and, unless there is a clear relationship between the change and a human activity, they are considered to reflect natural fluctuations. Because natural fluctuation is not presented as an option in section 4.2, option ‘f) yes, due to other reasons’ is selected. To reflect the natural dynamism of dune systems and the role of natural fluctuations in the range recorded during the current reporting period, the Favourable Reference Range is considered to be equal to the current range (NPWS, 2019).</td></tr>
</table>

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of 2170 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The number of 10x10 km grid cells in the range (31) is one grid cell (3%) greater than the last monitoring period (NPWS, 2019). This change is due to natural dynamism in coastal systems. The same methodology as used during the previous reporting period was again used, with all 10x10 km grid cells with a suitable coastline (i.e. capable of supporting sand dune habitats) retained within the range. Two grid cells (G88 and Q50) generated by the range tool were removed, as one had no coastline and the other did not have a coastline capable of supporting 2170 habitat. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). The observed increase in range was related to natural fluctuations and none of the area losses recorded during these two reporting periods led to a contraction in the range. The short-term trend is *stable*. In section 4.2, 'f) yes, due to other reasons' is selected because the observed difference between reporting periods is the result of natural fluctuations rather than a genuine, long-term improvement in the conditions supporting the extent of 2170 habitat in Ireland. The Favourable Reference Range remains at 3,000 km^2, as was the case during the previous reporting period (NPWS, 2019).

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2023***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.67 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* ***e) other reasons***	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.1%***
	b) Estimated Maximum	***0.1%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td>Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td>During the previous reporting period (NPWS, 2019) Favourable Reference Area (FRA) was estimated to be approximately equal to the area reported (2.61 km^2). However, an exact figure was not determined. At that time there had been little evidence of anthropogenic losses of 2170 habitat since the Directive came into force and so it was assumed that the current range at that time was approximately equal to the FRA for the habitat.</td></tr>
<tr><td>5.17 Additional information

Optional</td><td>The area of 2170 reported here (section 5.2) is based on distribution shapefiles of 2170, mainly from recent field survey data (2022/2023), but also including older data from previous surveys.

The total area for 2170 has increased from 2.61 km^2 in the previous reporting period to 2.67 km^2 in the current reporting period. The expansion of 2170 typically results in a decrease in the area of 2130 Fixed dunes or 2190 Dune slacks at a site. In this case, there was no evidence to connect the increase in 2170, which came at the expense of the priority habitat 2130 fixed dunes, to any human activities. The change was likely to be related to natural weather conditions affecting groundwater levels in the months preceding the monitoring survey. This is considered to be an example of natural dynamism of coastal habitats rather than a recovery or restoration of the habitat, and after</td></tr>
</table>

	a dry year the area could return to its previous extent. Such fluctuations in area are considered to be neutral processes unless anthropogenic activities such as groundwater abstraction or restoration activities are the cause of the changes. In section 5.5, 'f) yes, due to other reasons' is selected because much of the observed difference between reporting periods is the result of natural fluctuations rather than a genuine, long-term improvement in the conditions supporting the extent of 2170 habitat in Ireland. However, loss of 0.003 km^2 of 2170 habitat was recorded during the current reporting period due to the expansion of an alien invasive species: *Hippophae rhamnoides* (Sea-buckthorn). Sea-buckthorn was deliberately planted to reduce sand movement in the past and dense stands have resulted in the direct replacement of Annex I habitat with non-native scrub. This is therefore considered a genuine loss of habitat due to human activities. Short-term trend in Area was assessed as *decreasing* as there was a loss of 0.003 km^2 of 2170 habitat due to the expansion of Sea-buckthorn during the current reporting period. Long-term trend in Area was also assessed as *decreasing*, due to the loss of 0.003 km^2 in area during the most recent reporting period. No losses in habitat area were reported during the previous two reporting cycles.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***2.03 km²***
		Maximum	***2.03 km²***
	b) Area in not-good condition	**Minimum**	***0.64 km²***
		Maximum	***0.64 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species has remained the same over the last two reporting periods and was devised by Delaney *et al.* (2013). The Structure and functions criteria used to assess the 2170 habitat are listed in Appendix I of Delaney *et al.* (2013). Typical species: *Carex arenaria, Carex flacca, Euphrasia officinalis* agg., *Festuca rubra, Holcus lanatus, Lotus corniculatus, Ononis repens, Pilosella officinarum, Rhytidiadelphus squarrosus, Salix repens* ssp. *argentea, Scleropodium purum.*
6.8 Additional information *Optional*	During the current reporting period, the Structure and functions of 2170 were assessed using field data collected at 12 sites representing 42% of the total current area of 2170 nationally. This is deemed to be an adequate sample size with a good geographic spread and therefore is assumed to be a representative sample of the habitat nationally. Therefore, the percentage of 2170 habitat in good condition at these 12 sites was applied to the current total area of 2170 to determine the area of habitat in good condition. The area of 2170 where Structure and functions were assessed as being in good condition during the current reporting period accounts for 76% of the total area, which is very similar to the value of 75% used during the previous reporting period (NPWS, 2019). The short-term trend of habitat area in good condition is *stable*. The approach used to estimate the percentage of 2170 habitat in good condition at each site was as follows: If none of the Structure and functions assessment criteria failed at the site level and there was an absence of any impacting activities resulting in areas in not-good condition, 100% of the area was classified as being in good condition. In the instance where one or more of the Structure and functions criteria failed the assessment, the area of habitat where measures would need to be taken for those assessment criteria to pass was assigned as the area in not-good condition. This represents a change in methodology compared to the previous reporting period (NPWS, 2019), where the failure of one criterion resulted in 25% of the area being considered to be in not-good condition, and the failure of two or more criteria resulting in 25-100% of the area being considered in not-good condition. During the current assessment period, the most frequent criteria to fail the assessment were 'height of *Salix repens*' (seven sites), 'cover of trees and scrub other than *S. repens*' (six sites), and 'negative indicator species' (five sites). 'Height of *Salix repens*' and 'negative

	indicator species' were also frequently failing assessment criteria over the previous two assessment periods.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	High
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing	Minority <50%	High
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Hippophae rhamnoides* (Sea-buckthorn) is recognised as a pressure and a threat at a single site (Castlegregory Maharees).
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	
7.4 Additional information *Optional*	Data relating to pressures and threats were collected during field surveys during the current reporting period (Gallagher *et al.,* in prep.; Rigoni *et al.*, in prep.; NPWS, in prep.). Data relating to pressures were recorded at individual sites then collated and interpreted at a national

level. At the site level, the following information was collected regarding pressures: impact, influence, occurrence, timing, trend, and area impacted. These data were collated and interpreted, assigning values for timing, scope, and influence at a national scale.

At the national level, timing was recorded for each pressure under one of three categories: 'Past/suspended', 'Ongoing', and 'Ongoing/future'. When determining timing at the national level, the most current option was selected. For example, if a pressure was recorded as 'Past/suspended' at one or more sites, but was also recorded as 'Ongoing/future' at one or more sites, then 'Ongoing/future' was selected as the timing at the national level.

When determining scope, the total area recorded as being impacted by the pressure at individual sites was totalled and expressed as a percentage of the total area of the habitat nationally. Typically this resulted in values within the 'Minority <50%' category.

To determine the influence of the pressure at a national level, the influence at individual sites was considered in addition to the level of impact of the pressure (neutral/negative), and the area impacted at the site level in order to determine an average value not only amongst the sites surveyed, but at a national level. Where multiple values for influence were selected across sites, a best attempt at selecting a representative average value was made. For instance, if a pressure was recorded as having a high neutral impact at one site but a medium negative impact at a second site, a 'Medium' influence would be assigned to the pressure at the national level. If a pressure was only recorded at a single site, having a high neutral impact over a very small area, then this was assigned as having a 'Low' influence at the national level.

All recorded pressures were collated and ranked, however only those pressures clearly linked to area loss or failures in the Structure and functions assessment of the habitat are seen as being of highest importance, as addressing those pressures should contribute to an improvement in the overall conservation status of the habitat.

The following pressures are deemed to be of highest importance as they are resulting in habitat loss or failure of 2170 Structure and function assessment criteria.

PI02 – area loss
PA05 – S&F failure
PA08 – S&F failure
PB01 – S&F failure
PA01 – S&F failure

Pressures and threats recorded during the current reporting period are listed in section 7.1. The most frequently recorded pressure in 2170 habitat was PF05 (seven sites) due to pressure from walking tracks and trampling. These pressures were typically categorised as low- to medium-intensity pressures at the sites where they were recorded. The second most frequently recorded pressure was PA08 (six sites). In some cases (three sites), non-intensive grazing levels were recorded as having a positive impact, but the low levels of grazing were noted to have a negative impact at three sites and this was resulting in scrub encroachment. Although only recorded at a

	single site, PI02 (Sea-buckthorn) represents a serious pressure and threat to 2170 habitat at the sites where it occurs and has resulted in the loss of a small area of 2170 habitat during the current reporting period.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	The following conservation measures were recorded as being in place at some sites which support 2170 habitat. In the case of MF03, this measure was also noted as required, but not currently being implemented, at an additional site with 2170 habitat. MA03 Maintain existing extensive agricultural practices and agricultural landscape features MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	Conservation measures recorded across 14 sites that were field surveyed during the current reporting period were ranked based on their frequency of occurrence. The majority of conservation measures were noted to be required, but not currently being implemented. Conservation grazing has been implemented at Buckroney Dunes, while measures to prevent trampling associated with camping and other recreational activities have been taken at Castlegregory Maharees. The following conservation measures should be prioritised in order to address habitat loss and improve the Structure and functions assessment outcomes: MA01 – to improve outcome of S&F assessment MA04 – to improve outcome of S&F assessment MB01 – to improve outcome of S&F assessment MI02 – to address area loss During the previous reporting period (NPWS, 2019) the maintenance of extensive cattle grazing was noted as being in place due to the participation of some areas in the Department of Agriculture's Green, Low-Carbon, Agri-Environment Scheme (GLAS), which has since been replaced by Agri-Climate Rural Environment Scheme (ACRES). It is not possible to quantify the area of 2170 that is currently participating in ACRES and it is also difficult to determine what outcome the participation within ACRES will have on 2170 habitat. It should be noted that the management regimes of most Dunes with Creeping Willow are driven by the landowner rather than by any formal management plan or policy. Therefore, the continued operation of the management regimes currently in place is not guaranteed. The reinstatement of appropriate agricultural practices (MA04) was the most frequently recorded conservation measure in this habitat. Specifically, much of this habitat is recorded as currently being undergrazed and measures to reintroduce grazing or to increase the number of animals to achieve appropriate grazing levels are required. In some instances, regulation of current grazing levels is required to prevent overgrazing. The implementation of this measure should

	result in an improvement in the Structure and functions assessment for this habitat in future reporting periods. Other measures that are not currently being implemented, but have been identified for this habitat, include the prevention of conversion to agricultural land, regulation of recreational activities (walking), regulation of off-road driving for agriculture, and the control or eradication of established invasive alien species (Sea-buckthorn) and problematic native species (Bracken). All eight of these measures, with the exception of MA16, are proposed in order to improve the conservation assessments of 2170 habitat. MA01 Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA16 Other measures related to agricultural practices MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** / *Poor* / *Bad* / *Unknown*
	b) Area	*Good* / ***Poor*** / *Bad* / *Unknown*
	c) Structure and functions	*Good* / ***Poor*** / *Bad* / *Unknown*
9.2 Additional information *Optional*	The current range of 2170 has increased by one 10x10 km grid cell relative to the previous reporting period. Range is currently assessed as *Favourable* with a *stable* trend. Therefore, the Future prospects of the Range of 2170 are *Good*. There was a small loss of 2170 habitat (0.003 km^2) due to anthropogenic activity during the current reporting period. Therefore, the current Area assessment for 2170 is *Unfavourable-Inadequate* with a *decreasing* trend. The Structure and functions of 2170 are assessed as *Unfavourable-Inadequate* in the current reporting period as less than 90% of the habitat is in good condition. The future trend of Structure and functions is assessed as *stable*. Therefore Future prospects of Structure and functions are assessed as *Poor*.	

<table>
<tr><th colspan="3">10 Conclusions</th></tr>
<tr><td colspan="3">Assessment of conservation status at end of reporting period</td></tr>
<tr><td>10.1 Range</td><td colspan="2"><u>Favourable (FV)</u> / Inadequate (U1) / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.2 Area</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.3 Specific structure and functions (incl. typical species)</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.4 Future prospects</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td><u>b) yes, due to genuine change</u></td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is assessed as Favourable, as it was during the previous reporting period (NPWS, 2019).

Area was assessed as Unfavourable-Inadequate, a decline from Favourable in the previous reporting period.

Structure and functions and Future prospects are assessed as Unfavourable-Inadequate and this was also the case during the previous reporting period (NPWS, 2019).

The Overall assessment of Conservation Status is Unfavourable-Inadequate. This is the same as the previous reporting period (NPWS, 2019). The Unfavourable-Inadequate status assessment is due to 24%</td></tr>
</table>

	of the 2170 habitat not being in good condition and the loss of 0.003 km^2 of 2170 habitat as a result of anthropogenic activities. Trend in Overall Conservation Status was assessed as *decreasing*. This represents a change from the *stable* trend assigned during the previous reporting period (NPWS, 2019) because of a loss of 0.003 km^2 of 2170 habitat as a result of anthropogenic activities during the current reporting period.

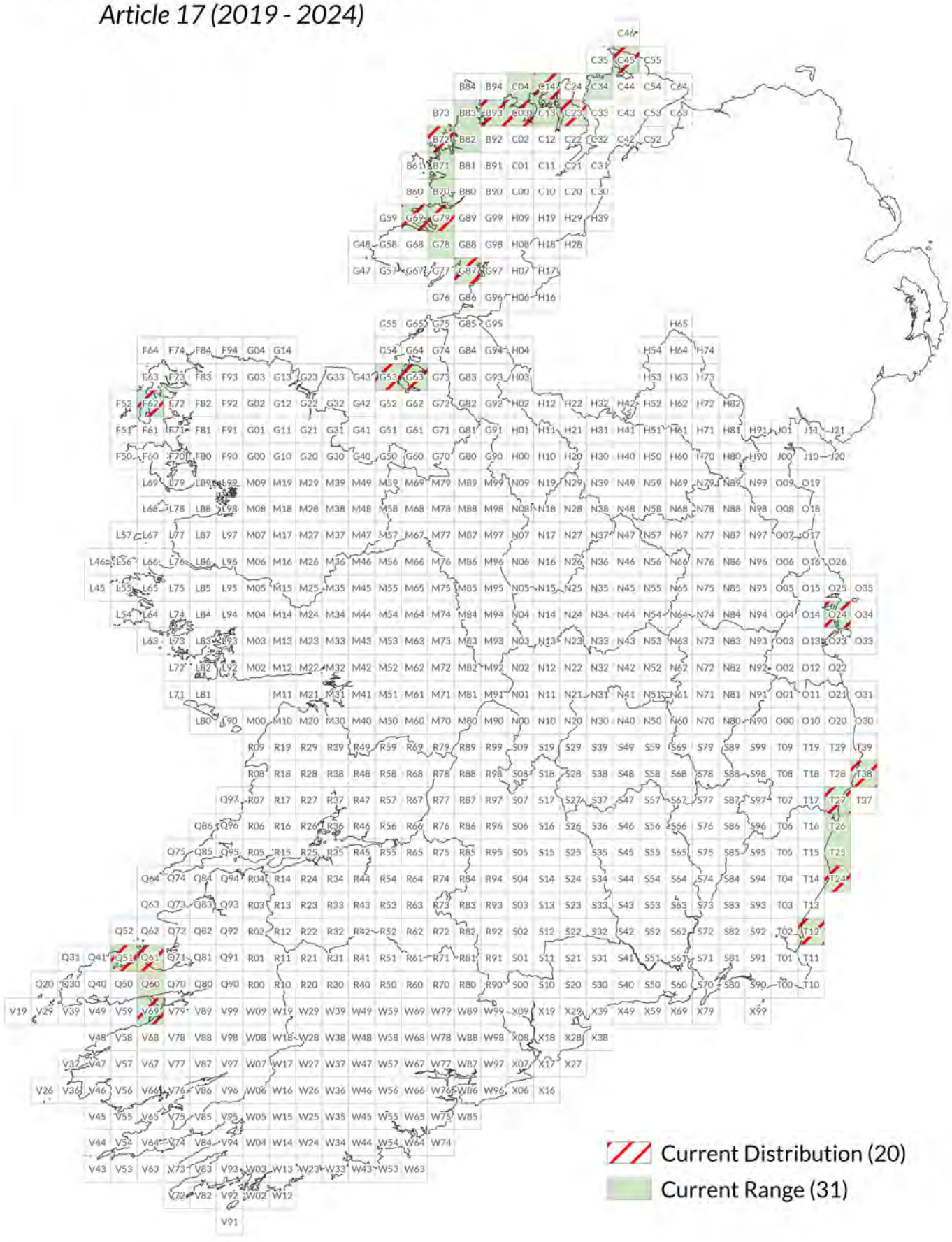
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km^2 in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.57 km^2***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / **decreasing** / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	

11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefile. The area given in section 11.1 is the total area of 2170 habitat occurring within SACs in Ireland, including some SACs where 2170 is not listed as a qualifying interest (QI). The area of 2170 within SACs where this habitat is listed as a QI is 1.09 km^2. 2170 habitat was recorded within seven SACs where 2170 is not listed as a QI as follows: Baldoyle Bay SAC, Ballysadare Bay SAC, Cahore Polders and Dunes SAC, Cummeen Strand / Drumcliff Bay (Sligo Bay) SAC, Malahide Estuary SAC, Mullet / Blacksod Bay Complex SAC and North Inishowen Coast SAC. During the previous round of reporting, no 2170 habitat was recorded within the Tranarossan and Melmore Lough SAC, but 2170 habitat was recorded here during the current reporting period. The presence of the habitat was attributed to a different and more detailed mapping technique. Area loss of 2170 due to anthropogenic activities recorded during the current reporting period occurred within the SAC network, therefore short-term trend of area within the SAC network is *decreasing*. The short-term trend of the habitat area in good condition within the SAC network is *stable*, the same trend as for the 2170 habitat nationally (see sections 6.4 and 6.8), as the majority of 2170 habitat surveyed during the last two reporting periods occurred within the SAC network.

12 Complementary information *N/A*

Dunes with Creeping Willow (2170)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**2190 Humid dune slacks**
1.2i Habitat short name	**Dune slacks**
1.3i Habitat description	2190 Humid dune slacks are the lowest lying regions within dune systems, typically found in hollows or depressions, either behind or between dune ridges. The soil in dune slacks is waterlogged, with the water table usually occurring within 1 m of the surface, with diurnal, seasonal, and annual fluctuations. Dune slacks can remain flooded for two to six months each year, and this strongly influences the vegetation present. Dune slacks can be classified as primary or secondary dune slacks depending on how they are formed. Primary dune slacks are formed by rapidly advancing dune ridges cutting off former beach plains from the influence of the sea. Secondary dune slacks are formed by blowing out in older dunes. In the case of both primary and secondary dune slacks, wind erodes the bare sand until the groundwater level is reached and pioneer dune slack vegetation begins to colonise. Dune slacks are rich in flora and can contain a number of vegetation communities according to the stage of succession from pioneer to mature dune slacks. Typical species include *Juncus* spp. (rushes), *Carex* spp. (sedges), *Hydrocotyle vulgaris* (Marsh Pennywort), *Menthe aquatica* (Water Mint), *Agrostis stolonifera* (Creeping Bent), *Potentilla anserina* (Silverweed), *Anagallis tenella* (Bog Pimpernel), and orchids including *Dactylorhiza* spp., *Neottia ovata* (Twayblade), and *Epipactis palustris* (Marsh Helleborine).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1996-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 2190 polygons mapped by the most recent Coastal Habitat Monitoring Project surveys (Gallagher *et al.,* in prep.; Rigoni *et al.,* in prep.; NPWS, in prep.), Delaney (2016), Wilson & Duff (2014), Woodrow & Denyer (2014), Delaney *et al.*

	(2013), Fingal County Council (2010), and Ryle *et al.* (2009), and point data from Campbell *et al*. (2019). All of the datasets listed above which were published prior to 2019 were also used to compile the distribution map for the last reporting period (NPWS, 2019). However, some polygons from these datasets may not have been included in determining the current distribution of 2190 in cases where the data have been superseded by a more recent survey. A certainty rating system was applied to each polygon that informed the distribution map. The rating system uses a range from 1 to 3, with 3 representing the highest level of certainty and 1 representing the lowest level of certainty. All polygons that were subject to a walkover field survey in 2022/2023 as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 3. Any polygons which were only viewed from a distance in the field, or subject to desktop survey as part of the Coastal Habitats Monitoring Projects were assigned a certainty level of 2. Data from Woodrow & Denyer (2014) and Delaney *et al.* (2013) were assigned a certainty level of 3 in the previous round of reporting. However, given the age of these data (now 10 years or older), a certainty level of 2 was assigned for the current round of reporting. Data from Campbell *et al.* (2019) was assigned a certainty level of 3 in the previous reporting period and this certainty level was retained in the current reporting period. Data from Ryle *et al*. (2009) was assigned a certainty level of 2 in the last round of reporting. As these data are now nearly 20 years old, a certainty level of 1 was assigned in the current reporting period. Data from Fingal County Council (2010) were assigned a certainty rating of 2 in the previous round of reporting, which was retained in the current reporting period. All polygons with a certainty rating of 1 or 2 were then individually assessed to confirm their certainty rating. This review process identified two polygons where it is likely that the current extent of 2190 is much reduced, however both sites are still considered capable of supporting 2190 habitat and so no changes were made as a result of this review. All polygons with certainty 1 to 3 were used to map the distribution of the 2170 habitat. It should be noted that as some polygons are now more than 20 years old, follow-up surveys should be undertaken to confirm the presence of 2190 habitat at these locations. During the previous reporting period, additional data sources which contributed to the creation of the distribution map of 2190 were Crawford *et al.* (1996), NPWS (2012), and Martin *et al.* (2017). These data were not included as they have been superseded by more recent surveys.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Campbell, C., Hodd, R. & O'Neill, F. (2019) The monitoring and assessment of *Petalophyllum ralfsii* (Petalwort) in the Republic of Ireland 2016–2018. *Irish Wildlife Manuals*, No. 109. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland). Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals*, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. Delaney, A. (2016) Biological communities and environmental controls in a seasonal wetland habitat. Ph.D. thesis, Trinity College, Dublin. Fingal County Council (2010) Shapefile supplied by Fingal for NPWS. Dublin. Gallagher, M.C. & Crushell, P. (in prep.) Monitoring Survey of coastal habitats in the south-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009) Coastal monitoring Project (2004-06). Unpublished report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Wilson, F. & Duff, K. (2014) Derrynane National Historic Park dune grassland survey and management recommendations. Unpublished report for The Office of Public Works, Knockreer House, Killarney, Co. Kerry.

	Woodrow, W. & Denyer, J. (2014) NIS: The use of designated machair within the West of Ardara / Maas Road SAC and Skeskinmore Lough SPA for the annual Ardara agricultural show. Unpublished report for National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***8,200 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

<table>
<tr><td>4.7 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>4.8 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>4.9 Long-term trend
Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 8,300 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">A Favourable Reference Range of 8,200 km^2 was set during the previous reporting period (NPWS, 2019). It reflected the current range of 2190 habitat at that time (8,100 km^2), in addition to one 10x10 km grid cell that had been lost due to anthropogenic activities during the previous reporting period (NPWS, 2013).</td></tr>
</table>

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of 2190 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Four 10x10 km grid cells generated by the range tool were deleted as they had no coastline and were not capable of supporting 2190 habitat (B92, G74, G88, and O15). The number of 10x10 km grid cells (82) in the current range is one cell higher than the last monitoring period (NPWS, 2019). The additional cell is due to improved knowledge and more accurate data (increased mapping accuracy). Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the area losses recorded during the current reporting period or the previous reporting period led to a reduction in range, and one additional 10x10 km grid cell (1.2%) was present in the current range of 2190 compared to that in the previous reporting period (NPWS, 2019). This was due to improved knowledge rather than a change due to habitat restoration, and therefore the short-term trend is *stable*. The long-term trend was estimated to be *decreasing* due to the loss of 2190 habitat in the reporting period before last (NPWS, 2013), which resulted in a decrease in the range by one 10x10 km grid cell (O17). There is no evidence that there has been any restoration of this habitat within that area to date. The Favourable Reference Range has been increased to 8,300 km^2 to reflect the current range of 2190 (increased by one 10x10 km grid cell since the previous reporting period due to more accurate data). The Favourable Reference Range also includes one 10x10 km grid cell that was previously lost (NPWS, 2013) and has not yet been restored (O17).

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2023***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.81 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.6%***
	b) Estimated Maximum	***0.6%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2"></td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2">A Favourable Reference Area (FRA) has not been exactly determined for 2190. During the previous reporting period (NPWS, 2019) it was estimated that the FRA was greater than the area reported at the time (2.71 km^2), but not by more than 10%. The FRA was deemed to be greater than the area reported at that time (NPWS, 2019) as some anthropogenic losses had occurred since the Directive came into place, in addition to losses due to natural processes.</td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The Area of 2190 reported here (section 5.2) is based on distribution shapefiles of 2190, mainly from recent field survey data (2022/2023), but also including older data from previous surveys. The current area is slightly higher than the 2.71 km^2 reported during the previous reporting period. This is due to an increase in the area of 2190 mapped at Aghleam (Mullet Peninsula). It is believed that this is due to a different and more detailed approach to habitat mapping in the most recent surveys.

Despite the overall increase in area, loss of 0.01 km^2 of 2190 habitat (0.6% of the area surveyed, which is deemed to be representative of the habitat nationally) was recorded during the current reporting period due to expansion of Hippophae rhamnoides (Sea-buckthorn), undergrazing leading to the establishment of scrub, and agricultural activities which damaged the habitat.</td></tr>
</table>

	Short-term trend in Area was assessed as *decreasing* due to this loss in area as a result of anthropogenic activity. Long-term trend was also assessed as *decreasing* due to losses in the current reporting period and the previous two reporting periods.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***2.30 km²***
		Maximum	***2.30 km²***
	b) Area in not-good condition	**Minimum**	***0.51 km²***
		Maximum	***0.51 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	The list of typical species has remained the same over the last two reporting periods and was devised by Delaney *et al.* (2013). The Structure and functions criteria used to assess the 2190 habitat are listed in Appendix I of Delaney *et al.* (2013). Typical species: *Agrostis stolonifera, Anagallis tenella, Bryum pseudotriquetrum, Calliergonella cuspidata, Campylium stellatum, Carex arenaria, Carex flacca, Carex nigra, Dactylorhiza* spp., *Epipactis palustris, Equisetum* spp., *Festuca rubra, Galium palustre, Hydrocotyle vulgaris, Juncus articulatus, Lotus corniculatus, Mentha aquatica, Potentilla anserina, Prunella vulgaris, Ranunculus flammula, Sagina nodosa, Salix repens* ssp. *argentea, Ophioglossum vulgatum, Aneura pinguis, Petalophyllum ralfsii.*		

6.8 Additional information *Optional*	During the current reporting period, the Structure and functions of 2190 were assessed using field data collected at 29 sites representing 62% of the total current area of 2190 nationally. This is deemed to be a good sample size and can be considered a representative sample of the habitat. The area of 2190 where Structure and functions were assessed as being in good condition during the current reporting period accounts for 82% of the total area, which is slightly less than the value of 88.5% during the previous reporting period (NPWS, 2019). The approach used to estimate the percentage of 2190 habitat in good condition at each site was as follows: If none of the Structure and functions assessment criteria failed at the site level and there was an absence of any impacting activities resulting in areas in not-good condition, 100% of the area was classified as being in good condition. In the instance where one or more of the Structure and functions criteria failed the assessment, the area of habitat where measures would need to be taken for those assessment criteria to pass was assigned as the area in not-good condition. This represents a change in methodology compared to the previous reporting period (NPWS, 2019), where the failure of one criterion resulted in 25% of the area being considered to be in not-good condition, and the failure of two or more criteria resulted in between 25-100% of the area being considered in not-good condition. There was also another difference in the methodology used when assessing Structure and functions in the field in the previous reporting period (NPWS, 2019) compared to the current reporting period. In the previous reporting period (NPWS, 2019) a single dune slack was assessed for Structure and functions at the majority of sites, whereas during the current reporting period Structure and functions were assessed at a representative sample of dune slacks within each site (in many cases all dune slacks present would have had at least one monitoring stop recorded within them, however this was determined based on the number of monitoring stops required and the number of dune slacks present). Therefore, although there has been a decrease in the area assessed as being in good condition, the short-term trend is determined to be *stable* as it is likely that much of this decrease is as a result of the differences in methodologies between reporting periods. During the last two reporting periods (NPWS, 2013, 2019) the criteria that most frequently failed the Structure and functions assessment were: 'positive indicator species', 'cover of scrub', 'forb:grass ratio', 'proportion of bare ground' and 'damage due to disturbance'. During the current reporting period, these criteria were again amongst the criteria that most frequently failed the assessment with 'cover of scrub' failing at thirteen sites, 'damage due to disturbance' failing at seven sites, 'positive indicator species' failing at six sites, 'forb:grass ratio' failing at five sites, and 'proportion of bare ground' failing at three sites. An additional five criteria also failed the Structure and functions assessment at one or more sites in the current reporting period, as follows: 'negative indicator species' (five sites), 'non-native species' (two sites), 'interference with sediment dynamics' (two sites), 'bryophytes' (two sites), and '*Salix repens'* (one site).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA22 Drainage for use as agricultural land	Ongoing	Minority <50%	High
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PF12 Residential, commercial and industrial activities and structures generating noise, light, heat or other forms of pollution	Ongoing and likely to be in the future	Minority <50%	Medium
PF17 Active abstraction of water for built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PL02 Drainage (mixed or unknown drivers)	Ongoing	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA19 Agricultural activities generating soil pollution	Ongoing	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R18921 *Elaeagnus rhamnoides* (=*Hippophae rhamnoides*) (Sea-buckthorn); R04400 *Crocosmia crocosmiiflora* (=*Crocosmia* x *crocosmiiflora*) (Montbretia); R03764 *Clematis vitalba* (Traveller's Joy)
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data*

	c) Based mainly on expert opinion with very limited data *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Data relating to pressures and threats was collected during field surveys during the current reporting period (Gallagher *et al.,* in prep.; Rigoni *et al.,* in prep.; NPWS, in prep.). Data relating to pressures were recorded at individual sites, then collated and interpreted at a national level. At the site level the following information was collected regarding pressures: impact, influence, occurrence, timing, trend, and area impacted. These data were collated and interpreted assigning values for timing, scope, and influence at a national scale. At the national level, timing was recorded for each pressure under one of three categories: 'Past/suspended', 'Ongoing', and 'Ongoing/future'. When determining timing at the national level, the most current option was selected. For example, if a pressure was recorded as 'Past/suspended' at one or more sites, but was also recorded as 'Ongoing/future' at one or more sites, then 'Ongoing/future' was selected as the timing at the national level. When determining scope, the total area recorded as being impacted by the pressure at individual sites was totalled and expressed as a percentage of the total area of the habitat nationally. Typically this resulted in values within the 'Minority <50%' category. To determine the influence of the pressure at a national level, the influence at individual sites was considered in addition to the level of impact of the pressure (neutral/negative), and the area impacted at the site level in order to determine an average value, not only amongst the sites surveyed, but at a national level. Where multiple values for influence were selected across sites, a best attempt at selecting a representative average value was made. For instance, if a pressure was recorded as having a high neutral impact at one site but a medium negative impact at a second site, a 'Medium' influence would be assigned to the pressure at the national level. If a pressure was only recorded at a single site, having a high neutral impact over a very small area, then this was assigned as having a 'Low' influence at the national level. All recorded pressures were collated and ranked, however only those pressures that are clearly linked to area loss or failures in the Structure and functions assessment of the habitat are seen as being of highest importance, as addressing those pressures should contribute to an improvement in the overall conservation status of the habitat. The following pressures are deemed to be of highest importance as they are resulting in habitat loss or failure of 2190 Structure and function assessment criteria. PA01 – area loss PA05 – S&F failure PA07 – S&F failure PA08 – S&F failure PA22 – S&F failure

	PF03 – S&F failure PI02 – area loss The most frequently recorded pressure was PA08 'Extensive grazing or undergrazing by livestock', which was noted at 15 sites. Non-intensive grazing was found to have a positive or neutral influence at some sites, though it was recorded as having a negative influence at the majority of sites (eight sites). The low levels of grazing were noted to be resulting in the establishment of scrub and rank vegetation within 2190 at these locations. Overgrazing was noted as a pressure at a smaller number of sites, leading to poaching and the presence of negative indicator species. PA01 was recorded at a single site but resulted in loss of area due to removal of the native vegetation, reprofiling and reseeding with agricultural grassland species. Pressures linked to recreational use of dunes (PF05) were recorded at 14 sites. In many cases the impact was linked to walking and tramping, however the depressed and sheltered nature of dune slacks within the wider dune landscape also mean that they are frequently used for camping, with evidence of campfires and dumping often present. PM07 'Natural processes without direct or indirect influence from human activities or climate change' was recorded at 12 sites, most typically due to the drying out of dune slacks resulting in the spread of *Salix repens* (Creeping Willow). Alien invasive species (PI02) were recorded as pressures at seven sites, with *Hippophae rhamnoides* (Sea-buckthorn) being the most frequently recorded species. Expansion of this species resulted in a small loss of 2190 habitat during the current reporting period.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	The following conservation measures are currently in place at some sites that support 2190. Three of the measures (MA04, MA05, and MF03) have also been identified as required, but not currently in place, at some sites. MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	Conservation measures recorded across the 29 sites that were field surveyed during the current reporting period were ranked based on their frequency of occurrence. MA04 and MF03 were the most frequent conservation measures identified. Conservation measure MA04 was identified at eight sites as not currently being implemented but required in order to address current levels of undergrazing, which in some instances is contributing to the encroachment of scrub and dominance of rank vegetation. Measures to reduce or eliminate the impact of recreational activities (MF03) were identified as being

	required at seven sites, but not currently being implemented. Conservation grazing is already in place at a number of sites including Ballyteige, Buckroney Dunes, Brittas Bay, Castlefreke, Culdafff, and Sheskinmore, while measures to prevent trampling associated with camping and other recreational activities have been taken at Castlegregory Maharees. It should be noted that the management regimes of most dune slacks are driven by the landowner rather than by any formal management plan or policy. The persistence of traditional grazing regimes has proved beneficial to many dune systems. While changes in stocking levels are regulated within the Natura 2000 network, the continued operation of the management regimes currently in place is not guaranteed. During the previous reporting period (NPWS, 2019) the maintenance of extensive cattle grazing was noted as being in place due to the participation of some areas in the Department of Agriculture's Green, Low-Carbon, Agri-Environment Scheme (GLAS), which has since been replaced by Agri-Climate Rural Environment Scheme (ACRES). It is not possible to quantify the area of 2190 that is currently participating in ACRES and it is also difficult to determine what outcome participation in ACRES will have on 2190 habitat. Additional conservation measures that are not currently being implemented, but whose implementation would improve the Structure and functions and possibly the extent of the habitat, are listed below. These conservation measures include the control of non-native species (in particular *Hippophae rhamnoides*) and the blocking of drains which are contributing to the drying out of 2190 habitat. These measures were also identified as being required during the previous reporting period (NPWS, 2019), but do not appear to have been implemented to date. All six conservation measures listed below are seen as necessary for *Favourable* outcomes in the conservation assessments of 2190 habitat in future reporting periods. MA01 Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land MA15 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MA16 Other measures related to agricultural practices MF02 Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species The following conservation measures that are not currently in place are listed to address habitat loss and improve the Structure and functions assessment outcomes: MA01 – to address area loss MA04 – to improve S&F outcome MA05 – to improve S&F outcome MA15 – to improve S&F outcome

	MF03 – to improve S&F outcome MI03 – to address area loss

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The short-term trend direction of Range is assessed as *stable*. The current range is less than the Favourable Reference Range, due to the loss of one 10x10 km grid cell during a previous reporting period (NPWS, 2013) which has not been restored. However, this is less than 2% below the FRR. The conservation status of Range is therefore *Favourable*. The future trend of Range is assessed as *stable* as no further change in range is expected given the current pressures and proposed conservation measures. Future Prospects of Range are therefore *Good*. The current area of 2190 is estimated to be <10% less than the Favourable Reference Area. There has been loss of 2190 due to anthropogenic activities. The conservation status of Area is *Unfavourable-Inadequate*. The future trend of Area is *decreasing* as there have been losses due to anthropogenic activities recorded in the last three reporting periods (NPWS 2013, 2019). Future prospects of Area are therefore *Poor*. Current Structure and functions are assessed as *Unfavourable-Inadequate*, as >75% but <90% of the habitat is in good condition. Therefore, the conservation status of Structure and functions is *Unfavourable-Inadequate*. Short-term trend direction of Structure and functions is *stable* for habitat that is in good condition. The future trend of Structure and functions is assessed as *stable*. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

10.5 Overall assessment of Conservation Status	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is assessed as *Favourable*, a change from *Unfavourable-Inadequate* in the last monitoring period. The Conservation Status of Area and Structure and functions are assessed as *Unfavourable-Inadequate*, as was also the case during the previous two reporting periods (NPWS, 2013, 2019). The Overall Conservation Status is *Unfavourable-Inadequate*, which is unchanged from the previous reporting periods. The *Unfavourable-Inadequate* status in the current reporting period is due to Area being assessed as 2-10% below the Favourable Reference Area and loss of area due to anthropogenic activity in the current reporting period, and 18% of the habitat assessed as being in not-good condition. Trend in Overall Conservation Status was assessed as *deteriorating*, which is the same as the previous reporting periods.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.70 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	

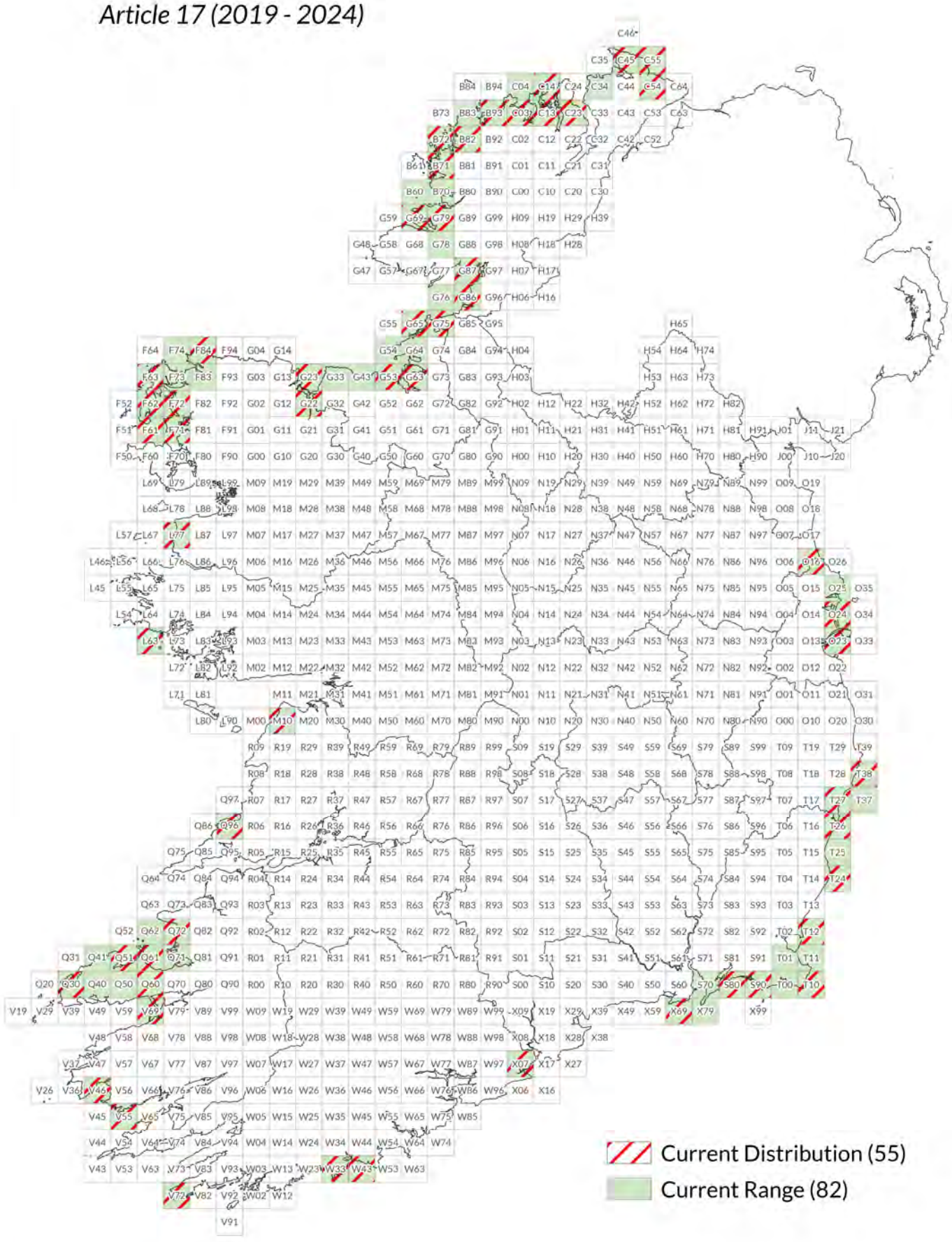
11.3 Surface area of the habitat type inside the network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefile. The area given in section 11.1 is the total area of 2190 habitat occurring within SACs in Ireland, including some SACs where 2190 is not listed as a Qualifying Interest (QI). The area of 2190 occurring within SACs where 2190 is listed as a QI is 2.18 km^2. There has been a slight increase in the area of 2190 recorded within the SAC network in the current reporting period in comparison to the previous reporting period (NPWS, 2019). However, despite this increase, area losses due to anthropogenic activities were recorded within the SAC network. Therefore, the short-term trend of habitat area within the SAC network is decreasing. The short-term trend for habitat area in good condition within the SAC network is determined to be *stable*, which is the same trend as for 2190 habitat nationally (see sections 6.4 and 6.8), as the majority of

	2190 habitat surveyed during the last two reporting periods occurred within the SAC network.

12 Complementary information *N/A*

Dune slacks (2190)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**21A0 Machairs (* in Ireland)**
1.2i Habitat short name	**Machair**
1.3i Habitat description	Machairs are complex and dynamic systems which are considered natural landforms that are the product of both wind erosion and cultural activities. They are globally restricted to the north-west coasts of Ireland and Scotland. Frequent species include *Festuca rubra, Lotus corniculatus, Plantago lanceolata, Bellis perennis, Carex arenaria, Galium verum* and *Trifolium repens*. There is, however, no suite of species unique to machair and physical characteristics are important in its definition. A machair should typically be a flat, sandy, coastal plain, in an oceanic location with a cool, moist climate. The sandy substrate should have a significant percentage of shell-derived material, producing a lime-rich soil with a pH normally greater than 7. The vegetation should be herb-rich, with a low frequency of sand-binding species. Wetness of the soil varies, due to the proximity of the water table, with much of the vegetation transitional between wet and dry communities. There should be a history of human interference, principally from grazing. This habitat is found in exposed locations between Galway Bay and Malin Head, Co. Donegal.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1995-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled using 21A0 polygons mapped by Rigoni *et al.* (in prep.), NPWS (in prep.), NPWS (2019), Woodrow & Denyer (2014), Delaney *et al.* (2013), O'Neill *et al.* (2013), Ryle *et al.* (2009), Crawford *et al.* (1996), and NPWS (2012). No points were used to inform the distribution map. All references are detailed below in section 3.2.

	All the aforementioned datasets published prior to 2019 were also used to compile the distribution maps from the last reporting period (NPWS, 2019). A certainty rating system has been applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest. Given that data collected during the current reporting round (Rigoni *et al.*, in prep.; NPWS, in prep.; Woodrow & Denyer, 2014) were based on a comprehensive field survey in the last 10 years and were judged to be good-quality datasets, they were given a high certainty of 3. Data collected before 2014, notably Delaney *et al.* (2013) and O'Neill *et al.* (2013), were assigned a certainty of 2. Ryle *et al.* (2009), Crawford *et al.* (1996), NPWS (2012) and some polygons of Delaney *et al.* (2013) that were not field-surveyed were assigned a certainty of 1. Thirty-three polygons from Crawford *et al.* (1996), Ryle *et al.* (2009), Delaney *et al.* (2013) and NPWS (in prep.) were assigned a certainty of 0 based on aerial imagery review or because they overlapped with 2130 habitat polygons and were used to compile both 21A0 and 2130 distribution maps during the last reporting period. Records with a certainty of 0 were excluded from the distribution map. Finally, all records were checked and in some cases certainty and coverage values were changed.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Reference to first report of the habitat: NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps Volume 2. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.
3.4 Sources of information	Campbell, C., Hodd, R. & O'Neill, F. (2019) The monitoring and assessment of *Petalophyllum ralfsii* (Petalwort) in the Republic of Ireland 2016-2018. *Irish Wildlife Manuals*, No. 109. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Crawford, I., Bleasdale, A. & Conaghan, J. (1996) Biomar Survey of Irish machair. A report submitted to National Parks and Wildlife Service, Dublin. Delaney, A., Devaney, F.M. & Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals,* No. 75. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

Doody, J.P. (2013) Sand Dune Conservation, Management and Restoration. Coastal Research Library 4. National Coastal Consultants, Huntingdon, UK.

EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien & F. McGovern. EPA, Wexford.

Martin, J.R., Daly, O.H. & Devaney F.M. (2017) Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites. Volume 1: Main report. *Irish Wildlife Manuals,* No. 98. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin.

Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin.

Martin, J.R. (2018a) SDMN17_SDM_update_2018.shp. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Martin, J.R. (2018b) SDMN17_2140_2150_points_2018.shp. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Martin, J.R. (2018c) SDMN17_Coastal_habitats_database_2018.mdb. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

Martin, J.R. (2018d) SDMN17_AR1719_pressures_assessment. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Backing Documents, Article 17 forms, Maps Volume 2. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

NPWS (2012) NPWS-Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012).

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht, Dublin.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS (in prep.) Monitoring surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. *Irish Wildlife Manuals*, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

Rigoni, P., Lupieri, G., Rodi E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland.

	Unpublished report submitted to National Parks and Wildlife Service, Dublin. Ryle, T., Connolly, K., Murray, A. & Swann, M. (2007) Coastal Monitoring Project 2004-2006: A report prepared for the National Parks and Wildlife Service, Research Branch Contract Reference D/C/79 (Unpublished). Woodrow, W. & Denyer, J. (2014) Natura Impact Assessment: The use of designated machair within the West of Ardara/Maas Road SAC and Sheskinmore Lough SPA for the annual Ardara agricultural show. Unpublished report submitted to National Parks and Wildlife Service, Dublin.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***5,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td>4.8 Long-term trend Period
Optional</td><td colspan="2">2004-2024</td></tr>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
<u>a) Complete survey or a statistically robust estimate</u>
b) Based mainly on extrapolation from a limited amount of data
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 5,800 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">Following NPWS (2007), the habitat range when the Directive came into force was estimated to be equal to 4,400 km² (44 10x10 km grid cells), based on Biomar survey (Crawford et al., 1996). During the 2013 reporting period the range and the associated favourable reference value were increased to 5,900 km² due to the use of a different method.</td></tr>
</table>

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 21A0 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Three grid cells generated by the range tool that had no coastline were removed, as during the last reporting period (NPWS, 2019). The current range value is 5,800 km^2 (58 10x10 km grid cells). Short-term trend was estimated based on data from the current reporting period and the 2013 reporting period (NPWS, 2013). As noted in the last report (NPWS, 2019), in 2013 only two 10x10 km grid cells that had no coastline were removed, while during the current and the previous reporting period three grid cells were removed (B81, B92, F82), resulting in the current range figure. The removal of these cells and the area losses recorded during these two reporting periods did not lead to a contraction in the range. The short-term trend in Range is *stable*. The long-term trend was estimated based on data from the current reporting period and the 2007 reporting period (NPWS, 2007). The changes in range value are due to different methods, therefore long-term trend was assessed as *stable* during the current reporting period. The Favourable Reference Range (FRR) is the same as the last report and it is estimated to be equal to the current range value of 5,800 km^2.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1996-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***30.37 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* ***f) yes, due to other reasons***	

	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2011-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***2.30%***
	b) Estimated Maximum	***2.30%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2004-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2">Following NPWS (2007), the habitat area when the Directive came into force was estimated to be 28.19 km², based on the area of machair recorded during that reporting period, plus the estimated loss of area since the Habitats Directive came into force.</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 1995, with the first data available on the 21A0 habitat coming from Management Planning Support Unit mapping carried out between 1995 and 2001 (NPWS, 2012) and incorporates updates made by surveys carried out between 1995 and 2024 that are listed in section 3.4.

Favourable Reference Area (FRA) was not determined exactly, the current area is between 2% and 10% smaller than the FRA. FRA is deemed to be greater than the current area, given that some anthropogenic losses have occurred since the Directive came into force. FRA was estimated to be less than 10% greater than the current area during the previous reporting period (NPWS, 2019) and FRA was estimated to be 32.18 km^2 in the 2013 report (NPWS, 2013), which is a less than 10% greater than the current area.

During the current reporting period, ten 21A0 sites were visited and assessed for Area during monitoring surveys (Rigoni et al., in prep.; NPWS, in prep.). In addition, 23 sites surveyed during the Coastal Monitoring Project (Ryle et al., 2007) were reviewed by aerial imagery. The ten sites assessed for Area represent 9.37 km^2 (30.8%) of the total area of 21A0 habitat recorded in Ireland, while the 23 desktop-reviewed sites represent 8.0 km^2 (26.3%). The ten sites surveyed</td></tr>
</table>

	during the current reporting period were previously surveyed by Delaney *et al.* (2013) and by Ryle *et al.* (2009). During the current reporting period, nine sites surveyed during the Sand Dunes Monitoring (SDM) project (Delaney *et al.*, 2013) were visited and assessed for Area by Rigoni *et al*. (in prep.) and NPWS (in prep.). Short-term trend was evaluated by a comparison of the sites across both datasets, and an area loss equal to 0.196 km^2 (2.30%) was recorded. During monitoring surveys (Rigoni *et al.*, in prep.; NPWS, in prep.), losses in area due to anthropogenic activities were accurately mapped, giving an estimated maximum and minimum of area loss of 0.026 km^2 (0.31%) and 0.011 km^2 (0.12%), respectively. Other losses were due to natural fluctuations of the 21A0 habitat, improved knowledge/more accurate data and the use of a different method. Given that part of the loss was the result of human impacts, short-term trend in Area was deemed to be *decreasing*. The long-term trend in Area was deemed to be *decreasing* based on the above-mentioned losses and the fact that a 6.5 ha loss of 21A0 habitat due to anthropogenic activities was reported in NPWS (2013). The habitat extent during the previous reporting period (NPWS, 2019) was 30.88 km^2 (NPWS, 2019) and today amounts to 30.37 km^2, a decrease of 0.51 km^2. This difference is due to a number of factors, in part due to natural fluctuations in this dynamic habitat and improved knowledge/more accurate data, partially due to the use of a different method than the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2007) and the elimination of an area equal to 0.17 km^2 resulting from polygons used for 2130 habitat and 21A0 habitat during the last reporting period, and lastly due to anthropogenic factors. During the current reporting period, area losses were estimated by field survey and desktop review. In the 33 sites surveyed by monitoring surveys (Rigoni *et al.*, in prep.; NPWS, in prep.) a slight increase of 0.5 km^2 has been recorded, although the loss in area due to anthropogenic activities was estimated to be equal to 0.11 km^2 since 1995. The main factors associated with area loss due to anthropogenic activities were housing, recreational activities and related structures and road network development. Other area losses were due to encroachment, farming and quarrying.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***23.62 km²***
		Maximum	***23.62 km²***
	b) Area in not-good condition	**Minimum**	***6.75 km²***
		Maximum	***6.75 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2011-2024***
6.4 Short-term trend of habitat area in good condition Direction	*stable / **increasing** / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as the last reporting period (NPWS, 2019) and was devised by Delaney *et al*. (2013). The Structure and functions criteria used to assess the 21A0 habitat are listed in Appendix I of Delaney *et al.* (2013). Typical species: *Agrostis stolonifera, Aira praecox, Bellis perennis, Carex arenaria, Carex flacca, Carex nigra, Cerastium fontanum, Crepis capillaris, Euphrasia officinalis* agg.*, Festuca rubra, Galium verum, Hydrocotyle vulgaris, Linum catharticum, Lotus corniculatus, Orchid* spp.*, Plantago lanceolata, Potentilla anserina, Prunella vulgaris, Rhinanthus minor, Sedum acre, Thymus polytrichus, Trifolium repens, Viola canina, Viola riviniana, Viola tricolor*.
6.8 Additional information *Optional*	During the current reporting period, ten 21A0 sites were visited and assessed for Structure and functions: eight by Rigoni *et al.* (in prep.) and two by NPWS (in prep.). Ten sites were surveyed and assessed for Structure and functions during the previous reporting period: four by Campbell *et al.* (2019), three by McGurn *et al.* (2018), two by Martin *et al.* (2017), and one site by Woodrow & Denyer (2014). The ten sites assessed for Structure and functions represent 9.37 km^2 (30.8%) of the total area of 21A0 habitat recorded in Ireland. During the last reporting period (NPWS, 2019) the ten sites surveyed represented 2.62 km^2 (8%) of the total area of the habitat, while during the previous reporting period (NPWS, 2013) twelve sites were assessed by Delaney *et al.* (2013) involving an area of 11.3 km^2 (35.1% of the total 21A0 area). In total, 77.8% (23.62 km^2) of the 9.37 km^2 of 21A0 habitat that was assessed for Structure and functions during the current reporting period was in good condition (favourable) and 22.2% (6.75 km^2) was in not-good condition (unfavourable) resulting in an overall conclusion of *Unfavourable-Inadequate*. This result is the same of the last reporting

	period (NPWS, 2019) when 77% of the area was in good condition and 22% in not-good condition. The approach used to estimate the percentage of the 21A0 habitat condition at each site was as follows: If none of the assessment criteria failed at the site level then none of the 21A0 area was classified as unfavourable and 90% to 100% of 21A0 area was considered as being in good condition. If some criteria failed, the exact area in unfavourable condition was calculated using a combination of individual plots data considered as representative of a portion of the habitat area, site-level indicators of monitoring stops, area affected by pressures recorded on-site and mapping. While this value was based on the area of the habitat that met the criteria of the Structure and functions assessments, in effect, sites where one to two criteria failed at the site level fell within the 75% to 89% range and less than 75% of the habitat was found to be in good condition at sites where three or more criteria failed. During the current reporting period, the most frequent criteria to fail the assessment were cover of bryophytes, damage due to disturbance, and sward height. Other failing criteria were lack of positive indicator species, presence of negative indicator species, and interference with sediment dynamics. During the previous reporting period (NPWS, 2019) the most frequent criteria to fail the assessment were sward height and damage due to disturbance. The short-term trend of habitat area in good condition was evaluated on 2013 reporting period findings (NPWS, 2013). During the last reporting period (NPWS, 2019), area in good condition was deemed to be a misleading indicator because the change from *Unfavourable-Bad* (NPWS, 2013) to *Unfavourable-Inadequate* was due to a change in methodology. During the current reporting period, the method used was similar to the one adopted in 2013 and the current short-term trend has been assessed comparing monitoring stops data of nine sites collected by Delaney *et al.* (2013), presented in NPWS (2013), and revisited by Rigoni *et al.* (in prep.) and NPWS (in prep.). On that basis, three sites increased from *Unfavourable-Inadequate* to *Favourable*, one site deteriorated from *Unfavourable-Inadequate* to *Unfavourable-Bad* and the other five sites remained *Unfavourable-Inadequate*. On that basis, short-term trend of habitat area in good condition was taken to be *increasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	High

PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Medium
PA04 Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.)	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	Medium
PA19 Agricultural activities generating soil pollution	Ongoing and likely to be in the future	Minority <50%	Medium
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Medium
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Medium
PF02 Construction or modification (e.g. of housing and settlements) in existing built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PD06 Transmission of electricity and communications (cables)	Ongoing and likely to be in the future	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PF15 Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
e) Invasive alien species of Union concern	N/A		
f) Other invasive alien species *Optional*	*Oryctolagus cuniculus, Yucca* sp.		

7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were selected and ranked from the following data: NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (in prep.) Monitoring Surveys of coastal habitats in the east and west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Rigoni, P., Lupieri, G., Rodi, E.S., Croci, G. & Minguzzi, E. (in prep.) Monitoring Survey of coastal habitats in the north-west of Ireland. Unpublished report submitted to National Parks and Wildlife Service, Dublin.
7.4 Additional information *Optional*	The pressures and threats presented in section 7.1 were selected and ranked based on timing (in the past but now suspended due to measures, ongoing, ongoing and likely to be in the future, or only in the future), scope (proportion of area affected: whole >90%, majority 50-90% or minority <50%), influence (high, medium, low). Data were gathered from the sources listed in section 7.3. For the current reporting period, data on pressures were available for ten 21A0 sites surveyed by Rigoni *et al.* (in prep.) and NPWS (in prep.) that represent 30.7% of the known area of the habitat within Ireland. An additional area representing 26.2% of the 21A0 habitat area was reviewed by aerial imagery in order to investigate the main pressures. In the visited sites, pressures and threats were assessed at site level based on intensity (high, medium or low), effect (negative, neutral or positive), source/occurrence (inside, outside, or both), timing (ongoing, past or future) and area of impact. Pressures noted by desktop review were assessed only for area affected and these data confirmed trends surveyed on the field. Therefore, the method used to assess pressures and threats was based mainly on extrapolation from a limited amount of data as stated in section 7.2. Three pressures, PA07 'Intensive grazing or overgrazing by livestock', PF05 'Sports, tourism and leisure activities' and PI02 'Other invasive alien species (other than species of Union concern)' were determined to have a high influence on the habitat area and condition. Notably overgrazing (PA07) was due to high sheep numbers resulting in trampling, livestock-assisted erosion and spreading of negative indicator species such as *Cirsium vulgare*, *Senecio jacobaea* and *Urtica dioica*; recreational activities (PF05) were associated especially with walking-assisted erosion, trail formation, off-road driving and parking; finally, invasive alien species (PI02) included rabbits and spreading of ornamental species from houses or recreational activities structures. Ten pressures were retained as medium-importance pressures, seven of them being related to agriculture-related practices such as

	reseeding (PA01), fencing (PA04), non-intensive grazing (PA08), farming structures (PA10), deposition of agricultural waste (PA19), drainage (PA22), and off-road driving and vehicle tracks (PA25); while the others were linked to roads and related infrastructure (PE01), caravan sites/mobile home for recreational activities (PF02) and natural processes without direct or indirect influence from human activities, notably erosion and succession to scrub, grassland and swamp vegetation (PM07). Pressures and threats noted less frequently and/or that impacted only small areas were deemed to be of low importance. PA07 had a negative impact on 32% of the 21A0 habitat area mapped in the surveyed sites, and it was recorded in nine sites out of ten. However it had a neutral effect on 9% of the area, and PA08 'Extensive grazing or undergrazing by livestock' had a neutral or positive influence on 19% and 12% respectively of the habitat area. The issue of grazing is complex, with both undergrazing and overgrazing by livestock recorded as medium/high-importance pressures for the 21A0 habitat since the 2007 reporting period (NPWS, 2007). On one hand, undergrazing can lead to the machair grassland becoming rank, with a subsequent loss of plant species richness (Doody, 2013). Conversely, overgrazing can lead to a loss in machair habitat quality, and increase the habitat's susceptibility to erosion (Doody, 2013). In order to achieve a suitable grazing regime to benefit the 21A0 habitat, a balance needs to be maintained between the two effects. Reduced fencing and low to medium-stocked seasonal cattle grazing is the preferred livestock grazing practice for machair, as sheep are more selective grazers (Doody, 2013). Generally, all the other agricultural pressures except for PA01 and PA22 are related to grazing. Recreational activities is the other widespread pressure group, with PF05 having a mostly high negative effect on 21.5% of the habitat area. This pressure includes walking, creation of desire-paths, car parking, off-road driving, and sport-related activities such as cutting of grassland for pitch and golf club maintenance. Other pressures related to recreational activities are PF02, PF03 and PF06. Note that PF02 was considered a high-influence pressure during the previous reporting period (NPWS, 2019) while in the current reporting period it was judged to have a medium influence because it was recorded only in one site. This may be an effect of the adoption of a new pressure list for the current reporting period, aimed at a more specific pressure description. The last high-influence pressure (PI02) highlights the impact of rabbit populations on the machair that create widespread bare sand at the affected sites. PE01 'Roads, paths, railroads and related infrastructure' and PM07 'Natural processes without direct or indirect influence from human activities or climate change' are listed in section 7.1 as medium-influence pressures, the first related to roads intersecting 21A0 sites and dune systems in general, the second referring to natural erosion and natural succession to other wet non-Annex I habitats and Gorse (*Ulex europaeus*) encroachment. In addition, PA01 'Conversion into

	agricultural land' and PA22 'Drainage for use as agricultural land' were recorded in small areas of three sites. Low-importance pressures recorded during the current reporting period included PA05 'Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)', PD06 'Transmission of electricity and communications (cables)', PF03 'Creation or development of sports, tourism and leisure infrastructure', PF06 'Deposition and treatment of waste/rubbish from built-up areas' and PF15 'Modification of coastline, estuary and coastal conditions for built-up areas'. Other pressures recorded on the 21A0 habitat but affecting specific tiny areas were PF17 'Active abstraction of water for built-up areas', PI03 'Problematic native species', PK05 'Mixed source soil pollution and solid waste (excluding discharges)', and PL02 'Drainage (mixed or unknown drivers)'. Climate change has not been added as an impact but it is likely to affect the range of 21A0 over the coming decades. The short-term predictability of the effect of climate change and in particular the resultant mean sea level rise and extreme weather events is unknown but the gradual long-term trend will see an increase in mean sea level and extreme weather (EPA, 2017) which will affect the 21A0 habitat. The pressures presented in section 7.1 are also considered to be the main threats in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')*

	c) Increase the surface area of the habitat type (related to 'Area covered by habitat') ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA14 Other measures related to agricultural practices MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	Conservation measures were selected and ranked based on the frequency of occurrence, using the data gathered during the current reporting period. These data were obtained for ten 21A0 sites surveyed by Rigoni *et al.* (in prep.) and NPWS (in prep.) that represent 30.2% of the known area of the habitat within Ireland. Conservation measures that are currently being implemented include MA03 'Maintain existing extensive agricultural practices and agricultural landscape features', MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)' and MF03 'Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)'; while implementation of MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) measure is required to control rabbit population. Other measures related to low-influence pressures affecting small portion of habitat area are MA01 'Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land' by regulation of reseeding, and MA14 'Other measures related to agricultural practices', related to off-road driving. During the previous reporting period (NPWS, 2019) measures listed were the same as during the current reporting period. In addition,

	notice of measure application by Department of Agriculture's Green, Low-Carbon, Agri-Environment Scheme (GLAS) and AranLIFE project were mentioned. GLAS has now been replaced by ACRES, and its impact on the conservation status of 21A0 will become evident over the next reporting period. Finally, the on-going project LIFE on Machair has begun to implement measures to improve the impact of agriculture and reduce the negative impacts of recreation on 21A0 (see section 8.5), and their outcome is likely to be visible in the next reporting period.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current area is <10% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative* as, even if measures will continue to contrast threats in the future, on the basis of the evidence to date, losses are likely to continue at least until the next reporting period. While the actions of LIFE on Machair may reverse some historic losses, it is too early to assess how successful habitat restoration to 21A0 Machairs will be. Future prospects of Area are therefore *Poor*. Short-term trend direction of Structure and functions is *increasing* for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable-Inadequate* as >75% but <90% of the habitat is in good condition (Area not in good condition is estimated to be 22.2%). Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *stable* as no change in Structure and functions is expected based on the balancing of threats and conservation measures to be taken. Future prospects of Structure and functions are therefore *Poor.*	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area, Structure and functions and Future prospects are *Unfavourable-Inadequate*, as they were in the previous reporting period. The Overall assessment of Conservation Status is *Unfavourable-Inadequate*. This is the same as the previous reporting period. The status of *Unfavourable-Inadequate* during the current reporting period is due to the current area being below the Favourable Reference Area, and >75% but <90% of the area of 21A0 habitat being assessed as having *Favourable* Structure and functions. Trend in Overall assessment of Conservation Status is *stable*, as it was in the previous reporting period.	

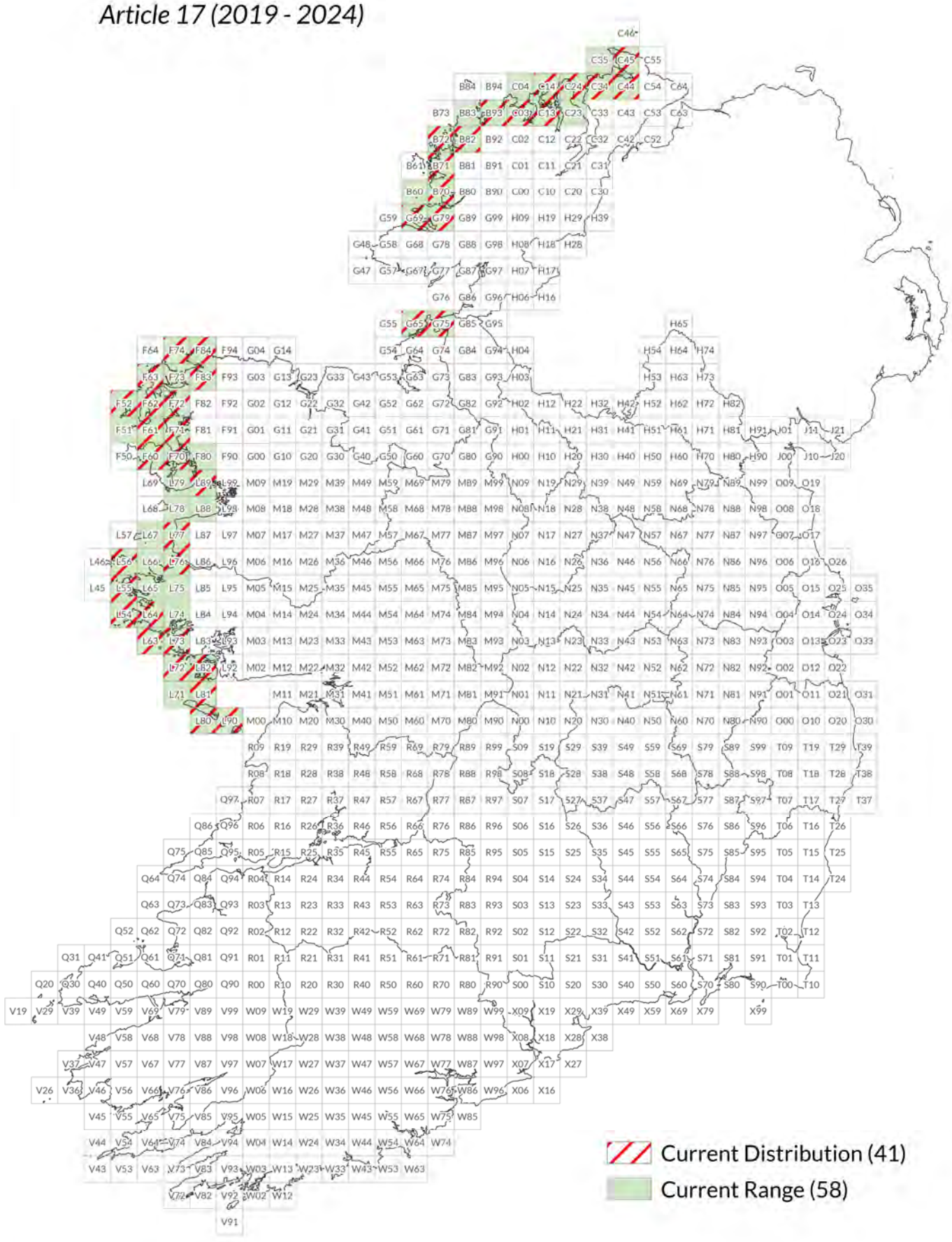
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***25.9 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* ***b) increasing*** *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing an intersect between the distribution shapefiles and the SAC shapefile. The area given in section 11.1 is the total area of 21A0 habitat in SACs in the country, including some SACs where 21A0 is not listed as a qualifying interest (QI). The area of 21A0 within the Natura 2000 network where it is listed as a QI is 25.2 km^2. Anthropogenic losses reported in the ten 21A0 sites assessed for Area during the current reporting period were in part from within the SAC	

	network. Direction of short-term trend of habitat area within the network has been assessed as *decreasing* due to these losses. The short-term trend of the habitat area in good condition within the SAC network is taken to be *increasing*, with the same trend as the 21A0 habitat nationally, as almost all areas of 21A0 habitat surveyed during the last reporting periods were within the SAC network. The surface area of 21A0 habitat within the SAC network has decreased from the previous reporting period; this is due to anthropogenic losses, improved knowledge, and change in methodology as per habitat area at national level (see section 5.17).

12 Complementary information *N/A*

Machair* (21A0)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)**
1.2i Habitat short name	**Oligotrophic isoetid lake habitat**
1.3i Habitat description	Ireland is a European stronghold for this soft-water, nutrient-poor lake habitat. It is quite species-poor and dominated by plants with an isoetid growth form, such as Quillwort (*Isoetes lacustris*), and Water Lobelia (*Lobelia dortmanna*). Other species such as Bulbous Rush (*Juncus bulbosus*) and Bog Pondweed (*Potamogeton polygonifolius*) also commonly occur. Habitat 3110 is frequent in catchments where peatland overlies acid bedrock (notably granite and old red sandstone). It is best developed on more gentle slopes along sheltered shorelines. The habitat is also found in upland lakes, such as corries, and earlier references to it as a 'lowland lake' type were incorrect. Habitat 3110 can be difficult to distinguish from dystrophic lake habitat 3160. Habitat 3110 has a widespread distribution in Ireland, occurring in a large number of lakes. It is under significant pressure from drainage and other damage to peatland, and eutrophication. Damage to peatland can result in hydrological changes in lakes, increased organic matter, water colour and turbidity, changes in sediment characteristics, acidification and even enrichment. The habitat requires oligotrophic conditions.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2000-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution of habitat 3110 in Ireland is based on the 2013-2018 Article 17 distribution. Site-specific conservation objective mapping shapefiles published in April 2022 were used to review these data, as well as some lake vegetation data (*e.g*. Roden *et al*., 2021, 2024; Lally *et al*., 2025; N.F. Stewart, pers. comm.). As in 2019, the distribution is a hybrid dataset of lake polygons mapped at two scales: 1:50,000

	(WFD Lake Segments) and 1:5,000 (site-specific conservation objectives). NPWS (2013, 2019) and O Connor (2015) provide details on the 2013-2018 and 2007-2012 Article 17 mapping. Following revision, the 2019-2024 distribution is based on 1,612 lake segments* occupying a total of 175 10x10 km grid cells. One 10x10 km grid cell was added (V69) to the 2013-2018 distribution and two removed (V99, G95) based on the site-specific conservation objective data and Roden *et al*. (2021). (*In general, a GIS lake segment corresponds to a single lake.) There has been no comprehensive survey of the habitat in Ireland and its characteristics and ecological requirements have not been fully elucidated. As a result, confidence in the classification of lake segments and the distribution mapping is low to moderate. The habitat is distributed across 14 counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Kildare, Leitrim, Mayo, Monaghan, Sligo, Tipperary, Waterford, and Wicklow). The inclusion of data at a different map scale (1:5,000) may lead to small differences between reporting periods, as shoreline geometry and lake segment area vary between map bases.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Cappelli, G. (2024) Physico-chemical characterisation and biological communities assessment of protected dystrophic lake habitats in Ireland: Determining their conservation needs. Unpublished PhD Thesis, Atlantic Technological University. Cappelli, G., Gray, E., Gammell, M., Roden, C. & Lally, H. (2023) Physico-chemical characterisation of protected lake habitats: a matter of dystrophy, *Limnologica,* doi: https://doi.org/10.1016/j.limno.2023.126123. DHLGH (2024) Water Action Plan 2024. A River Basin Management Plan for Ireland. Government of Ireland. https://www.gov.ie/en/campaigns/0f55e-river-basin-management-plan/. Drinan, T.J. (2012) The impact of conifer plantation forestry on the ecology of peatland lakes. Unpublished Ph.D. Thesis, UCC, Cork. Drinan, T.J., Graham, C.T., O'Halloran, J. & Harrison, S.S.C. (2013) The impact of catchment conifer plantation forestry on the

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4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***23,000 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 23,000 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/moderate/**low***
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current distribution of the habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 230 10x10 km grid cells. As explained at section 2.5, the current distribution of habitat 3110 occupies a total of 175 10x10 km grid cells: one grid cell was added and two were removed from the 2013-2018 distribution based on improved knowledge from the site-specific conservation objective data and Roden *et al*. (2021). The consequence of these changes in distribution is that the range has decreased by 300 km^2 since 2013-2018.	

	There is no evidence of a decline in the range of habitat 3110. Lake habitats suffer damage as a result of hydrological and morphological change, decreased water clarity, eutrophication and other impacts, but are seldom destroyed. The result is that the trend of Range of lake habitats remains *stable*. As there is no evidence of a decline in range since the Directive came into force, and the extent of the range is large at approximately 26% of the (87,700 km^2) terrestrial grid and the habitat is widespread (found in 14 counties), it is assumed that the current range includes all significant Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat. Therefore, the current range is set as the Favourable Reference Range.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***355 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	

5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 355 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/moderate/**low***
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The distribution was used to estimate habitat area, following the approach employed for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. Lake surface area is likely to overestimate the area of habitat 3110 as its vegetation seldom covers the bed of the lake, and because more than one Annex I standing water habitat can occur in a lake. A best single value area estimate of 355 km^2 (35,539 ha) is reported, based on the summed surface areas of all 1,612 lake segments that were classified as containing the habitat. Unlike for the 2007-2012 and 2013-2018 cycles, an estimate of the area of unclassified lake segments was not included (NPWS, 2013, 2019; O Connor, 2015), because unclassified segments contributed less than 5% of the maximum area reported in 2019. Given the low confidence in the classification of many of the 1,612 lakes (see section 2.5), and because the habitat rarely covers an entire lake bed and may co-occur with other Annex I lake habitats, 355 km^2 is considered to be a significant overestimate of the area of the habitat in Ireland. Area was reported as 399-416 km^2 for the 2013-2018 cycle, which is larger than that reported here (355 km^2). The changes are the result of the use of a different map base (1:5,000 scale) and improved knowledge of the distribution of lake habitats. There is no evidence of a decline in area since the Directive came into force and the estimated surface area is considered sufficient to ensure the long-term viability of the habitat type. As a result, the estimated surface area is set as the Favourable Reference Area.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***104 km²***
		Maximum	***104 km²***
	b) Area in not-good condition	**Minimum**	***60 km²***
		Maximum	***60 km²***
		Minimum	***191 km²***

	c) Area where condition is not known	**Maximum**	***191 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* **YES***/NO*		
6.7 Typical species Method used *Optional*	The list of typical species for habitat 3110 was based on the interpretation manual of EU habitats (CEC, 2013), available publications on lake macrophyte communities in Ireland and Great Britain, as well as publications on aquatic macrophyte species and macrophyte data from routine Water Framework Directive monitoring. The new list of typical species is: *Isoetes lacustris, Isoetes echinospora, Littorella uniflora, Lobelia dortmanna, Eriocaulon aquaticum, Juncus bulbosus, Potamogeton polygonifolius, Sparganium angustifolium, Deschampsia setacea* (in Connemara)*, Subularia aquatica, Pilularia globulifera, Nitella translucens, Nitella opaca, Nitella confervacea, Myriophyllum alterniflorum, Nymphaea alba, Nuphar lutea, Potamogeton natans, Utricularia intermedia* agg.*, Utricularia minor, Eleogiton fluitans*. See NPWS (2013) and O Connor (2015) for more information. The list was reviewed based on the findings of the PeAT lakes project (Cappelli, 2024; Cappelli *et al*., 2023; Gray, 2022; Lally *et al*., 2025), which recorded 24 macrophytes across the 24 study sites. Based on the project findings, *Eleocharis multicaulis* can be added to the typical species list. Further work is needed to elucidate the true distribution of bladderworts in Ireland. *Utricularia intermedia* agg. is a poorly known complex of three species, *Utricularia intermedia s.s*., *Utricularia ochroleuca* and *Utricularia stygia*, for which there are few reliable records (Stroh *et al*., 2023). *Utricularia australis*, which is also poorly recorded in Ireland and falls under *Utricularia vulgaris* agg., may also		

	be associated with the habitat, while *Utricularia minor* may be more typical of habitat 3160.
6.8 Additional information *Optional*	Habitat 3110 is a naturally nutrient-poor habitat that is associated with peatland and upland areas and base-poor water. By definition, the habitat requires oligotrophic conditions. Studies investigating the condition and distribution of lake habitats 3130 and 3140 and the Slender Naiad (Roden *et al*., 2020, 2021, 2024) included some lakes with habitat 3110; however, in the absence of a standard assessment methodology, the condition of 3110 could not be assessed. The PeAT lakes project made recommendations for research, monitoring and assessment of habitats 3110 and 3160 (Lally *et al*., 2025). Further work is needed to implement a representative monitoring programme for habitat 3110, using practical, standardised methods. As in previous cycles (see NPWS, 2013, 2019; O Connor, 2015), water quality data from the EPA WFD monitoring programme for a sample of 3110 lakes were used to inform the assessment of Structure and functions. Studies of other lake habitats, however, have found that derived WFD data, such as 'ecological status' or 'macrophyte status' cannot be used to indicate the conservation condition of habitats 3130, 3140 or the Slender Naiad (Roden *et al*., 2020, 2021). In consequence, WFD ecological status assessments may not reflect the conservation condition of 3110 lakes and confidence in this analysis is low. Data for a total of 58 WFD monitoring lakes were examined. The 58 lakes had a total area of 163.7 km^2, and are considered likely to contain habitat 3110. Given that habitat 3110 is, by definition, oligotrophic, a target of WFD 'high status' was used. EPA data for Macrophyte, Phytobenthos, Phytoplankton, Nutrient Conditions and Acidification Status were examined and a target for good condition set as oligotrophic (or WFD 'high status'). – Overall ecological status was high (good condition) at 13 lakes with a total area of 17.06 km^2, or 10% of the area assessed (45 lakes or 164.64 km^2 and 90% area in not-good condition). However, not all elements included in the one-out-all-out WFD status assessment are relevant to lake conservation condition. – 'Macrophyte status' was high at 33 lakes with a total area of 115.59 km^2 (21 lakes or 48 km^2 in not-good condition) – 'Phytoplankton status' was high at 47 lakes with a total area of 139.09 km^2 (11 lakes or 24.61 km^2 in not-good condition) – 'Nutrient conditions status' was high at 37 lakes with a total area of 132.19 km^2 (18 lakes or 31.53 km^2 in not-good condition) – Only one lake failed to reach high 'Acidification status', representing 0.1% of the area assessed. Combining the results for macrophyte, phytoplankton, nutrient conditions and acidification statuses and applying a one-out-all-out rule (i.e. for good condition, all four elements had to reach high status.

	If one or more WFD element was good, moderate, poor or bad status, the lake was considered in not-good condition. – 29 lakes had high status (good condition) with a total area of 103.86 km^2 or 29% of the estimated surface area (see 5.2) – 29 lakes with a total area of 59.84 km^2 were in not-good condition or 17% of estimated area, – The area where condition is not known is 355 km^2 minus 164 km^2 or 191 km^2 or 54% of the total estimated area. As the estimated area in not-good condition was less than 25% of the total estimated area, in line with the 'General evaluation matrix' and the 'Explanatory Notes and Guidelines', Structure and functions is assessed as *Unfavourable-Inadequate* overall. This change from the *Unfavourable-Bad* status reported in 2013-2018 is the result of the more conservative approach adopted here which used fewer WFD monitoring lakes and fewer WFD status elements. Previously misclassified lakes were removed from the analysis, as well as lakes containing more than one lake habitat. As noted above, the findings of research on other Annex I freshwater habitats and Annex II freshwater species have shown that WFD status is not a reliable indicator of conservation condition (Moorkens & Killeen, 2020; O Connor, 2016; Roden *et al*., 2020, 2021; Roden & O Connor, 2024). As in previous cycles, confidence in the Structure and functions assessment is low. In the absence of dedicated habitat monitoring and a habitat-specific assessment approach, the trend in Structures and function must be reported as *uncertain*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA20 Livestock farming generating pollution	Ongoing and likely to be in the future	Minority <50%	Medium
PB23 Physical alteration of water bodies for forestry (including dams)	Ongoing and likely to be in the future	Minority <50%	Medium

PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Medium
PC08 Extraction activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PJ03 Changes in precipitation regimes due to climate change	Only in the future		
PJ09 Landslides, subsidence and solifluction due to climate change	Only in the future		

e) Invasive alien species of Union concern	R05501 *Elodea nuttallii* R08062 *Lagarosiphon major*
f) Other invasive alien species *Optional*	R04306 *Crassula helmsii*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Free *et al*. (2009) recognised that the main threats to isoetid lakes across Europe come from eutrophication, acidification and alkalinsation, water level changes, habitat destruction, peat erosion and invasive alien species. Pressures and threats reported for the 2007-2012 and 2013-2018 cycles were updated to the new codes and included again for this cycle. NPWS (2013) detailed how these were identified through examination of available pressure data from research projects, as well as WFD and forestry data. See also O Connor (2015). Peatland, particularly blanket bog, is frequent in the catchments of 3110 lakes. Drainage of peatland, for agriculture, forestry, turf-cutting and other purposes, can result in indirect hydrological impacts on the habitat. The aeration and mineralisation of peat caused by drainage increases losses of ammonia and dissolved and particulate organic fractions. These pollutants, in turn, cause increased colour and turbidity, increased sedimentation and enrichment of oligotrophic lakes. Nutrient and organic pollution also arises from more intensive agricultural use (e.g. chemical fertilisation, slurry spreading), particularly on peat and other wet soils. Pollution with dissolved and particulate organic matter, as well as fine sediment, can also arise from agriculture through overgrazing of peatland, as well as burning. Conifer forest on peatland results in high pollutant loads. Direct loss of dissolved nutrients can occur during fertilisation. Significant losses of both organic matter and nutrients occur following tree-felling, through slow decomposition of conifer needles, branches and roots

	(EPA Catchment Science & Management Unit, 2024; Drinan, 2012; Drinan *et al*., 2013; Flynn *et al*. 2022; Kelly-Quinn *et al*., 2016). Pollution also results from drainage and disturbance of peatland for turf-cutting and wind farm development. Waste water from on-site systems (unsewered properties) is a common pressure in the catchments of 3110 lakes, but some larger 3110 lakes are also impacted by urban waste water. There are abstractions from at least 49 3110 lakes, however there is no evidence that these are currently impacting on the habitat. It is possible, however, that abstractions will be a threat, in combination with predicted droughts owing to climate change. Climate change impacts are listed as threats, but it is possible that these are already manifested pressures, particularly as they can exacerbate all of the existing pressures. Changing precipitation patterns are a particular concern, with increases expected in dry or drought periods and intensive rainfall and storm events. As well as potentially reducing the number of overall rainfall days, factors seen as important in the creation and maintenance of peatland habitats, these changes are likely to result in increased mineralisation of peat and increased risks of peat erosion and land-slides. More frequent, high-intensity rainfall is expected to result in greater losses of pollutants from land. Prolonged droughts are likely to result in lower water levels and direct impacts on shoreline vegetation, as well as constriction or loss of submerged vegetation zones. Increased temperatures and sunshine may promote nuisance species, such as cyanobacteria, other phytoplankton, filamentous algae, and large perennial macrophytes. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', presents data on the numbers of water bodies impacted by significant pressures which show 85 lakes are impacted by agriculture, 15 by hydromorphological pressures, 14 by forestry, 10 by urban waste water, nine by domestic waste water, two by peat, one by industry, 50 by other and 26 by unknown pressures (DHLGH, 2024).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* a) Measures identified, but none yet taken *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MF04 Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures MK01 Reduce impact of mixed source pollution
8.7 Additional information *Optional*	Information is available from EPA water quality and other WFD data and analyses to broadly identify the conservation measures required to maintain or restore the habitat. These include: 1. reversal of drainage impacts/ restoration of hydrological regime, and

	2. reducing pollution (with dissolved and/or particulate nutrients, humic substances, organic matter and fine sediment/turbidity) from agricultural, forestry, turf-cutting, and domestic and urban waste-water sources. Significant progress has been made with domestic waste water treatment systems through the inspection regime (under the Domestic Waste-Water Treatment Regulations) and associated grant scheme. There is also on-going substantial investment by Irish Water in urban waste water treatment and collection systems. Option (c) 'Part of measures identified have been taken' was chosen, but the majority of the most important measures identified, particularly in relation to agriculture, forestry, and peat extraction, have not yet been implemented. Implementation of the Water Framework Directive (WFD) in Ireland does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024). It contains, as an action (3.8): "The water-related requirements of water-dependant habitats and species will be reviewed by the Water Division, the National Parks and Wildlife Service and the EPA during the third RBMP cycle, taking account of the most recent scientific evidence. If necessary, proposals for updating the related water standards will be made and this will be integrated into the catchment management process." Site-specific conservation objectives for 3110 in the 28 SACs designated for its protection were published between 2015 and 2021, with a supporting document published in 2015 (O Connor, 2015). WFD objectives are set as either good or high ecological status for WFD waterbodies, and are based on WFD ecological status assessments alone. Of the 58 lakes with habitat 3110 with WFD monitoring data 2016-2021 (see section 6.8), 24 were assigned a WFD high status objective, the remaining 34 having the objective of good status. Currently, a WFD standard exists for one of the habitat's ecological requirements, total phosphorus, specified in the habitat's conservation objectives. The target for good conservation condition is set as an average of ≤0.010 mg/l TP, which matches the ecological quality standard for WFD high status in lakes (S.I. No. 77 of 2019). In consequence, the WFD total phosphorus objective of good (≤0.025 mg/l TP) is not sufficiently stringent. Of the 24 high status objective lakes, 12 were assessed as at risk of not meeting their WFD objectives. Nine of the 34 lakes were assessed as at risk of not meeting their WFD good status objective. An overall WFD high ecological status objective does not guarantee *Favourable* conservation condition for the habitat as targeted WFD standards do not currently exist for the other key requirements including water colour and DOC. Protecting and restoring 3110 lakes requires that the habitat's ecological requirements are included within WFD waterbody objectives, as a minimum for known sites within the 28 SACs designated for its protection.

	WFD programmes do not, therefore, constitute adequate conservation measures to protect or restore the habitat to *Favourable* status. However any measures to reduce diffuse pollution to surface or ground waters from agricultural and residential activities (MA09, MA10, MF04, MK01) should improve water quality and have a positive knock-on effect on habitat condition. Agricultural measures to protect water quality are also being implemented through a range of mandatory (e.g. the Nitrates Action Programme and Good Agricultural Practice Regulations) and voluntary initiatives (e.g. LAWPRO-ASAP farm advisory services, the Agri-Climate Rural Environment Scheme (ACRES) Co-operation Projects, Waters of LIFE IP, Farming for Water EIP). Enforcement has also been improved under the National Agricultural Inspection Programme, with additional staff in local authorities and the EPA. Overall, significant focus is being placed on as yet unproven source control measures (e.g. increased slurry storage) and pathway interception measures (e.g. buffers) rather than source reduction measures. There is also a general lack of sufficient information on nutrient sources (in terms of field-scale livestock density and applications of chemical fertilisers and slurry) and nutrient pathways (in terms of drainage channels and pipes) to develop targeted source control measures such as detailed nutrient management plans. Forestry measures for water quality are a combination of mandatory requirements and voluntary schemes. While various schemes are now available to support restructuring of plantation forests post clear-felling, no effective measures have been identified to prevent water quality impacts on high-risk sites during forest felling and forest road construction, and there are limited/no DAFM schemes available to fund either water quality mitigation measures during these operations, or to remove plantations and restore open habitats (peatland, other wetland, grassland, etc.). There is insufficient focus, therefore, on managing the large 'legacy' of inappropriately sited conifer plantations on blanket peat and other organic soils. It is noteworthy too that the restructuring options focus on creation of buffer zones and the use of continuous cover forestry, which is not yet a proven sylvicultural technique on peat and other organic soils. Planting of more intensively used agricultural land with native tree species could lead to water quality improvements, but will need to be strategically planned, spatially, and consider the risks of exacerbating droughts through evapotranspiration in the current and projected future climate scenarios.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information	The Future prospects of the Range, Area and Structure and functions of habitat 3110 were assessed by reference to pressures and threats	

Optional	and conservation measures, as well as each parameter's 'future trends' and current status: *Pressures and threats:* Ten pressures were recorded and all were assessed as ongoing and likely to be in the future. Two additional climate change threats were also identified. The pressures and threats cause changes in hydrological regime and water quality and, therefore, have negative impacts on the habitat's Structure and functions. *Conservation measures:* Limited habitat-specific, concrete conservation measures are currently being undertaken to protect or restore the habitat, either within SACs or the wider countryside. Furthermore, implementation of the WFD in Ireland to date has not integrated the water-related ecological requirements/conservation objective targets of habitat 3110 into its objectives, status or risk assessments, plans or programmes of measures. Implementation of necessary catchment measures takes time and, once implemented, there is typically a time-lag before measures take effect. Therefore conservation measures, if taken, will not halt or reverse the negative influence of the pressures and threats in the next 12 years. *Range:* The short- and long-term trends of Range were assessed as *stable*. The current range is equal to the Favourable Reference Range and considered to include 'all significant Irish ecological variations of the habitat' and to be sufficiently large to allow the long-term viability of the habitat. Therefore, the Conservation Status of Range is *Favourable*. While pressures may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3110 lakes, hence the range is unlikely to change. The future trend of Range is, therefore, likely to remain *stable* and, the Future prospects of Range have been assessed as *Good*. *Area:* The short- and long-term trends of Area were assessed as *stable*. The estimated surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. Therefore, the Conservation Status of Area is *Favourable*. While pressures may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3110 lakes, hence the habitat area is unlikely to change. The future trend of Area is, therefore, likely to remain *stable* and the Future prospects of Area have been assessed as *Good*. *Structure and functions:* No dedicated monitoring programme exists for lake habitat 3110 in Ireland, so water quality data from the EPA WFD monitoring programme for a sample of 58 3110 lakes were used to assess Structure and functions. Studies of other lake habitats, however, have found that WFD ecological status cannot be used to indicate conservation condition. In consequence, confidence in the Structure and functions assessment is low. A total of 29 of the 58 WFD monitored 3110 lakes were in not-good condition, representing 17% of the total estimated area. As the estimated area in not-good condition was less than 25% of the total, Structure and functions is assessed as *Unfavourable-Inadequate* overall. In the absence of dedicated habitat monitoring and a habitat-specific assessment

	approach, the trend in Structures and function must be reported as *uncertain*. However, given the negative influence of the identified pressures and threats on the structure and functions and the lack of targeted conservation measures, the future trend is likely to be *negative*. As a result, the Future prospects of Structure and functions were assessed as *Poor*. As the Future prospects of the Structure and functions were assessed as *Poor*, the Future prospects for habitat 3110 were assessed as *Unfavourable-Inadequate* overall.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating / stable /* ***unknown***	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	***d) yes, due to the use of different method***
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */ unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */unknown/ other reasons*

10.8 Additional information *Optional*	*Range:* As there is no evidence of a decline in Range since the Directive came into force (s*table* short- and long-term trends), the area of the range is equal to the Favourable Reference Range and is large at approximately 26% of the terrestrial grid, and the current range is considered to include all significant Irish 'ecological variations of the habitat' and to be sufficiently large to allow the long-term viability of the habitat, Range was assessed as *Favourable*. While there may be significant deterioration in the structure and functions of the habitat, it is unlikely that any 3110 lakes will be lost, hence the range is unlikely to change. *Area:* There is no evidence of a decline in Area since the Directive came into force (*stable* short- and long-term trends) and the area is large at 355 km^2. The estimated surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. As a result, Area was assessed as *Favourable*. While there may be significant deterioration in the structure and functions of the habitat, it is unlikely that any 3110 lakes will be lost, hence the habitat area is unlikely to change. Range and Area are insensitive measures of the conservation status of lake habitats, given that lakes are damaged rather than lost, and are inappropriate parameters to use in setting targets for nature restoration and protection. Further research may demonstrate that deterioration of habitat quality can reach a point beyond which the habitat is no longer restorable and lakes where this occurs could be reported as site loss, and result in a reduction in habitat area, and possibly even range. Until then, the conservation status of lake habitats will be determined by the Structure and functions assessment. Conservation measures to protect and restore the habitat need to be implemented in terrestrial catchments. Given the magnitude, extent and expense of effective conservation measures for lake habitats, it is essential that they are prioritised and spatially focused to ensure the protection and, where possible, restoration, of the best examples of the habitat. *Structure and functions:* Habitat 3110 is naturally nutrient-poor and requires oligotrophic conditions. As there is no dedicated monitoring programme for lake habitat 3110, EPA WFD water quality monitoring data for Macrophyte, Phytobenthos, Phytoplankton, Nutrient Conditions and Acidification Status were used to assess Structure and functions. Studies of other freshwater habitats and species, however, have found that WFD 'ecological status' cannot be used to indicate conservation condition (Moorkens & Killeen, 2020; Connor, 2016; Roden *et al*., 2020, 2021; Roden & O Connor, 2024). In consequence, confidence in the Structure and functions assessment is low. A total of 29 of the 58 WFD monitored lakes were in not-good condition, representing 17% (60 km^2) of the total estimated area. The 29 lakes in good condition (achieving high status for all five WFD elements), represented 29% (104 km^2) of the total estimated area. As the estimated area in not-good condition was less than 25% of the total, Structure and functions are assessed as *Unfavourable-Inadequate* overall. In the absence of dedicated habitat monitoring and a habitat-specific assessment approach, the trend in Structures and function is reported as *uncertain*. As in previous cycles, confidence in the Structure

	and functions assessment is low. This change from the *Unfavourable-Bad* status reported in 2013-2018 is the result of the more conservative approach adopted here which used fewer WFD monitoring lakes and fewer WFD status elements. Previously misclassified lakes were removed from the analysis, as well as lakes containing more than one lake habitat. *Future prospects:* Given the *Unfavourable-Inadequate* status of the habitat's Structure and functions, the pressures and threats identified, and the limited habitat-specific conservation measures, the Future prospects were assessed as *Unfavourable-Inadequate*. As Structure and functions and Future prospects were assessed as *Unfavourable-Inadequate*, the Overall Conservation Status of 3110 was assessed as *Unfavourable-Inadequate.* The trends for Range and Area were assessed as *stable*, and for Structure and functions as *uncertain*. The overall trend was assessed as *unknown*, because Range and Area are insensitive measures of the conservation status of lake habitats. Evidence of the condition and trends in habitat 3130, as well as the documented pressures and lack of habitat-specific conservation measures suggests that the Structure and functions of habitat 3110 may be *deteriorating*. A comprehensive survey is needed of habitat 3110 in Ireland to map its distribution, describe its characteristics and ecological requirements, and develop specific conservation condition assessment methods, as well as to test the applicability of the WFD data used above.

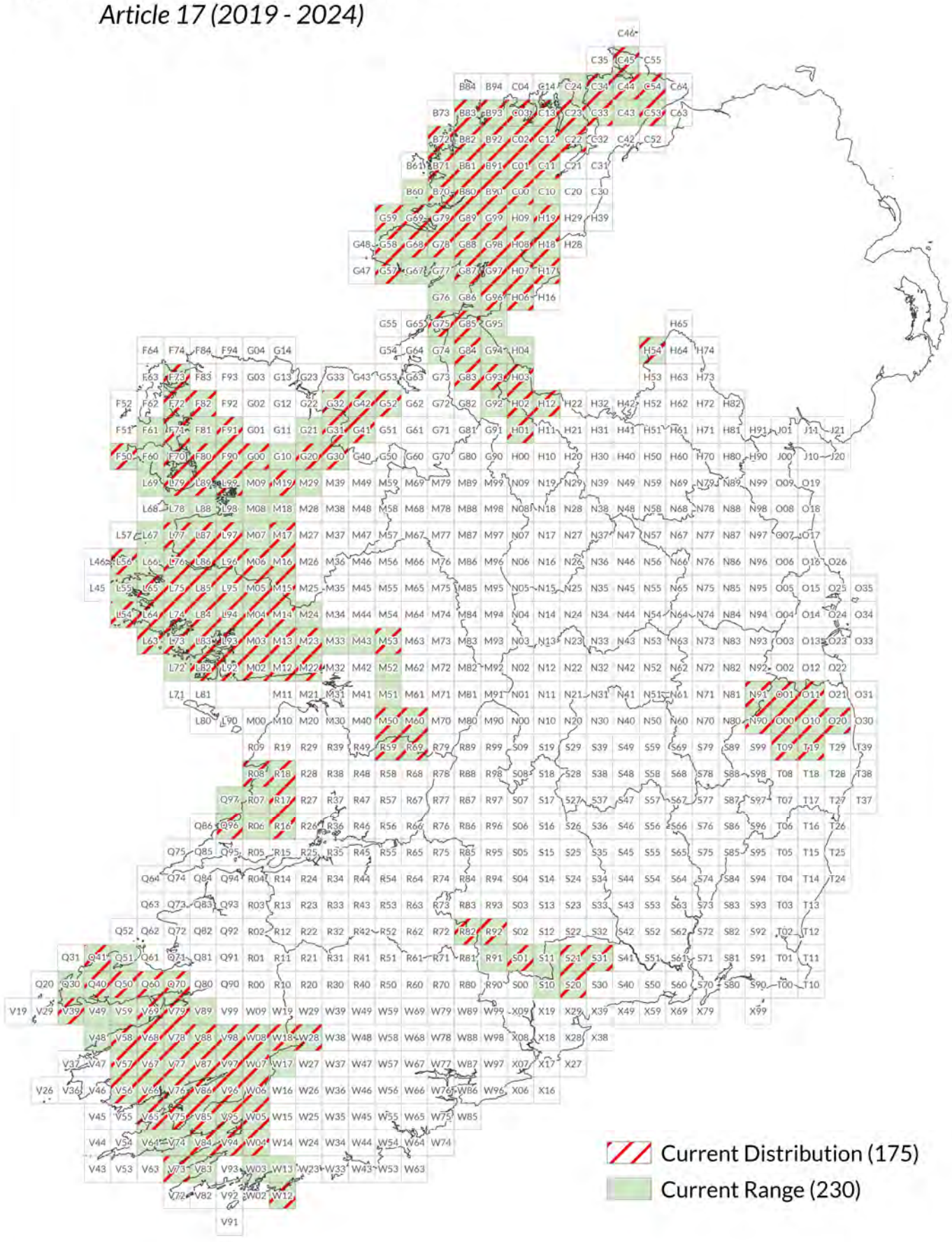
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***294 km²***
	b) Maximum	***303 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* ***d) Insufficient or no data available***
11.8 Additional information *Optional*	The distribution was used to estimate the surface area of the habitat type inside the pSCIs, SCIs and SACs network, following the approach employed for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. The minimum estimate (29,408.335 ha = 294 km^2) summed the surface areas of the lake segments that were classified as containing the habitat and were within SACs designated for the protection of the habitat. The maximum estimate (30,290.15 ha = 303 km^2) summed the surface areas of all lake segments that were classified as containing the habitat and were wholly within any SAC. See section 6.8 for information on the Structure and functions assessment.

12 Complementary information *N/A*

Oligotrophic isoetid lake habitat (3110)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea***
1.2i Habitat short name	**Slender Naiad-type lakes**
1.3i Habitat description	Habitat 3130, 'Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*' is known in Ireland as the intermediate-alkalinity, moderate-alkalinity, or Slender Naiad-type lake. The habitat is characterised by a species-rich flora, three main vegetation zones including a rare deep-water vegetation community, and a deep euphotic zone (Roden *et al*., 2021). The rare Annex II macrophyte Slender Naiad (*Najas flexilis*) is a typical species and occurs in the deep-water community. The deep-water community also includes other regionally or nationally scarce species: *Hydrilla verticillata*, Pillwort (*Pilularia globulifera*), stoneworts (*Nitella confervacea* and *Nitella translucens*), and the water-starwort *Callitriche hermaphroditica*. The habitat contains species otherwise found either in more basic or more acidic lake types, for example the co-occurrence of *Potamogeton perfoliatus* and *Isoetes lacustris* is also characteristic. Ballynakill Lough near Cleggan in Connemara is regarded as one of the best examples of lake habitat 3130 in Ireland (Roden *et al*., 2021; Roden & O Connor, 2024). Owing to its rare species and communities, and relatively high species richness, habitat 3130 is of high conservation value. Lakes with habitat 3130 are scarce in Ireland and Scotland, and even more so in continental Europe. In Ireland, the habitat is widespread along the western fringe (NPWS, 2013; Roden & Murphy, 2014; Roden *et al*., 2021, 2024). The habitat occurs in lakes with alkalinity intermediate between that of oligotrophic and marl lakes, low-nutrients and clear water, in catchments of mixed geology (Roden *et al*., 2021). Base-rich influences come from basalt, limestone, marble, sedimentary deposits or calcareous coastal sand, and peatland and heath are often widespread in the catchments. The deep-water flora is highly sensitive, particularly to changes that reduce the amount of light reaching the lake bed. Such changes include increased water colour and increased growth in larger, more vigorous rooted water plants. Increased water colour results from losses of carbon to water from drained and degraded peatland. Decomposition of organic compounds can also lead to nutrient enrichment and eutrophication impacts, while chemical fertilisers and waste waters are also sources of nutrient pollution. Habitat 3130 is under significant pressure from land uses including agriculture, peat-extraction, forestry and rural buildings (wastewaters). The habitat has deteriorated significantly in recent years at Loughs Leane and Sessiagh owing to eutrophication, and at Kiltooris Lough

	owing to drainage. All three lakes are amongst the most important sites for the habitat in Ireland. Lough Leane at almost 20 km^2 is one of the largest sites for the habitat with, formerly, the largest population of Slender Naiad on the island and, likely, in Europe. Based on monitoring data from 2014-2024 for 39 lakes, the habitat was assessed as being in *Unfavourable* condition at 22 lakes, and *Favourable* at 17. Protecting and restoring habitat 3130 requires appropriate catchment management and, consequently, its conservation objectives and specific ecological requirements need to be included within the WFD and other policies and programmes that aim to protect and restore water quality and quantity.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2000-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution of habitat 3130 in Ireland is based on the 2013-2018 Article 17 distribution. Site-specific conservation objective mapping shapefiles published in April 2022 were used to update these data, as well as some lake vegetation data (*e.g*. Roden *et al*., 2021, 2024; N.F. Stewart, pers. comm.). As in 2019, the distribution is a hybrid dataset of lake polygons mapped at two scales: 1:50,000 (WFD Lake Segments) and 1:5,000 (site-specific conservation objectives). NPWS (2013, 2019) and O Connor (2015) provide details on the 2013-2018 and 2007-2012 Article 17 mapping. Following revision, the 2019-2024 distribution is based on 446 lake segments* occupying a total of 169 10x10 km grid cells. Two 10x10 km grid cells were added (G73, M22) to the 2013-2018 distribution and three removed (V69, V76, V86) based on the site-specific conservation objective data and Roden *et al*. (2021, 2023). (*In general, a GIS lake segment corresponds to a single lake.) Confidence in habitat classification is high for the approximately 55 lakes with field survey data, but is low for most of the other c. 391 lakes classified as 3130, where classification was based on geological and other mapping data. This is particularly true of areas of the south-east (Waterford, Wexford) and the drumlin belt (Monaghan, Cavan,

	Leitrim) (NPWS, 2013). Field survey is necessary to confirm the habitat's exact distribution. The habitat is distributed across 16 counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Louth, Mayo, Meath, Monaghan, Roscommon, Sligo, Waterford, Wexford and Wicklow). The inclusion of data at a different map scale (1:5,000) leads to small differences between reporting periods, as shoreline geometry and lake segment area vary between map bases.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	BSBI (2023) Ireland's Changing Flora. *A Summary of the Results of Plant Atlas 2020*. Botanical Society of Britain & Ireland. https://plantatlas2020.org/sites/default/files/bsbi_data/home/BSBI%20Plant%20Atlas%202020%20summary%20report%20Ireland%20WEB.pdf. DHLGH (2024) Water Action Plan 2024. A River Basin Management Plan for Ireland. Government of Ireland. https://www.gov.ie/en/campaigns/0f55e-river-basin-management-plan/. Gunn, I.D.M. & Carvalho, L. (2020) Slender Naiad (*Najas flexilis*) Habitat Quality Assessment. CRW2018_27. Scotland's Centre of Expertise for Waters (CREW). https://nora.nerc.ac.uk/id/eprint/528396/1/N528396CR.pdf. NBDC Biodiversity Maps https://maps.biodiversityireland.ie/Map. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/Article_17_Print_Vol_2_report_habitats_v1_1_0.pdf. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf . NPWS Flora Protection Order Viewer https://www.npws.ie/maps-and-data/npws-flora-protection-order-2022-map-viewer-vascular-plants-charophytes-and-lichens.

O Connor, Á. (2013) Article 17 assessment form and audit trail for *Najas flexilis*, the Slender Naiad (species code 1833). Backing Document. April 2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/1833_Najas_flexilis_Article_17_Backing_Document_AOC_Apr_2013_FINAL.pdf .

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Roden, C.M. (1999) A survey of Irish machair Loughs. Unpublished report submitted to the Heritage Council.

Roden, C.M (2004) The distribution of *Najas flexilis* in Ireland 2002-2004. Unpublished report to the National Parks and Wildlife Service, Dublin.

Roden, C. (2007) Conservation Assessment of Slender Naiad (*Najas flexilis* (Willd.) Rostk. & W.L.E.Schmidt) in Ireland. March 2007. Slender Naiad (*Najas flexilis*) (1833) Conservation Status Assessment Report. Backing Document. In: National Parks and Wildlife Service (Ed.) The Status of EU Protected Habitats and Species in Ireland, Backing Documents, Article 17 Forms, Maps. Volume 2, 824-840. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2007_Cons_Ass_Backing_V2.pdf.

Roden, C. & Murphy, P. (2014) Targeted survey of *Najas flexilis*. Unpublished report to the National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/2014%20targeted%20Najas%20survey.pdf.

Roden, C., Murphy, P. & Ryan, J.B. (2021) A study of lakes with Slender Naiad (*Najas flexilis*). *Irish Wildlife Manuals*, No. 132. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/IWM132.pdf.

Roden, C., Murphy, P. & Ryan, J.B. (2021) A study of lakes with Slender Naiad (*Najas flexilis*) – Appendix V Site Reports. *Irish Wildlife Manuals*, No. 132. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland https://www.npws.ie/sites/default/files/publications/pdf/IWM132%20Appendix%20V.pdf.

Roden, C., Murphy, P., Ryan, J. & Flynn, O. (2024) Survey and monitoring of lake habitats and Slender Naiad in 2023 and 2024. Report to the National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/Lake_Surveys_2023_2024_DL_GY_MO_RN_CE_Roden_et_al_2024.pdf.

Roden, C. & O Connor, Á. (2024) Lakes of Distinction – Habitats Directive Annex 1 Lake Habitats. In: C. Dalton, E. de Eyto and

Jennings, E. (eds) *Lakes in Ireland - Mirrors of Change*. Independently Published. DOI http://hdl.handle.net/10793/1973

Schou, J.C., Moeslund, B., van de Weyer, K., Lansdown, R.V., Wiegleb, G, Holm, P., Baastrup-Spohr, L. & Sand-Jensen, K. (2023) *Aquatic Plants of Northern and Central Europe including Britain and Ireland*. Princeton University Press, Oxford.

Stroh, P.A., Walker, K.J., Humphrey, T.A., Pescott, O.L. & Burkmar, R.J. 2023. *Plant Atlas 2020. Mapping Changes in the Distribution of the British and Irish Flora*. 2 volumes. Botanical Society of Britain and Ireland and Princeton University Press. https://plantatlas2020.org/index.php/ and BSBI Distribution Database https://bsbi.org/maps-and-data.

van Groenendael, J., Roozen, T., van Mansfeld, M. & van Mansfeld, M. (2020) *The hidden lakes of Connemara – Tribute to a fascinating landscape*. Self-published, reissued by Artisan House, Letterfrack (2023).

Site-specific Conservation objectives published since last Article 17 report:

NPWS (2019) Conservation Objectives: Leannan River SAC 002176. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002176.pdf

NPWS (2021) Conservation Objectives: Aughrusbeg Machair and Lake SAC 001228. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001228.pdf

NPWS (2021) Conservation Objectives: Lough Carra/Mask Complex SAC 001774. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001774.pdf

NPWS (2021) Conservation Objectives: Lough Nageeron SAC 002119. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002119.pdf

NPWS (2021) Conservation Objectives: Tully Lough SAC 002130. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002130.pdf

NPWS (2021) Conservation Objectives: Sessiagh Lough SAC 000185. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000185.pdf

	NPWS (2021) Conservation Objectives: Kindrum Lough SAC 001151. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001151.pdf NPWS (2021) Conservation Objectives: Rusheenduff Lough SAC 001311. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001311.pdf NPWS (2021) Conservation Objectives: Barnahallia Lough SAC 002118. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002118.pdf NPWS (2024) Conservation Objectives: Horn Head and Rinclevan SAC 000147. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000147.pdf

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***25,300 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
	a) Estimated Minimum	

4.5 Short-term trend Magnitude *Optional*	**b) Estimated Maximum**	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 25,300 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:*

		*high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 253 10x10 km grid cells. As explained at section 2.5, the current distribution occupies a total of 169 10x10 km grid cells: two grid cells were added and three were removed from the 2013-2018 distribution based on improved knowledge from the site-specific conservation objective data and Roden *et al*. (2021, 2024). The consequence of this change in the mapped distribution is that the range decreased by 300 km^2 since 2013-2018. There is no evidence of a decline in the range of habitat 3130. Lake habitats suffer damage as a result of hydrological and morphological change, decreased water clarity, eutrophication and other impacts, but are seldom destroyed. The result is that the range of lake habitats remains s*table*. As there is no evidence of a decline in range since the Directive came into force, and the area of the range is large at approximately 26% of the (87,700 km^2) terrestrial grid and the habitat is widespread (found in 16 counties), it is assumed that the current range includes all significant Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat. Therefore, the current range is set as the Favourable Reference Range.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	***63 km^2***
	b) Maximum	***356 km^2***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) 63 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The distribution was used to estimate habitat area. Estimates used the surface area of the lake polygons classified as containing the habitat. The minimum area estimate is based on 55 lakes with high confidence that the habitat is present, based on expert field survey. The area of the 55 lakes sums to 6,284.44 ha, or 62.8 km^2.

The maximum estimate is based on the sum of the surface areas of the 446 lake segments used to map the distribution and range (35,637.34 ha, 356 km^2). Unlike for the 2007-2012 and 2013-2018 cycles, an estimate of the area of unclassified lake segments was not included in the maximum area (NPWS, 2013, 2019; O Connor, 2015). Improved knowledge of the habitat's distribution and evidence that the habitat is relatively scarce (Roden et al., 2021, 2024) make it unlikely that significant areas of habitat 3130 exist outside of the mapped lakes. In addition, unclassified segments contributed less than 5% of the maximum area estimate in 2019. Given the low confidence in the classification of many of the 446 lakes (see section 2.5), and because the habitat rarely covers an entire lake bed and may co-occur</td></tr>
</table>

	with other Annex I lake habitats, 356 km^2 is considered to be a significant overestimate of the area of the habitat in Ireland. The estimated area reported for the 2013-2018 cycle was 78-372 km^2. The slight reductions in minimum and maximum estimated areas (63-356 km^2) are the result of improved knowledge of the habitat's distribution from field survey, and the differences in method caused by the replacement of 1:50,000 polygons with 1:5,000 scale mapping data and the exclusion of unclassified segments from the maximum estimate. There is no evidence of a decline in Area since the Directive came into force and the estimated minimum surface area is considered sufficient to ensure the long-term viability of the habitat type. As a result, the estimated minimum surface area is set as the Favourable Reference Area.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***6.9 km²***
		Maximum	***39 km²***
	b) Area in not-good condition	**Minimum**	***54.4 km²***
		Maximum	***309 km²***
	c) Area where condition is not known	**Minimum**	***1.5 km²***
		Maximum	***8 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO*		

6.7 Typical species Method used *Optional*	The list of typical species was updated based on the work of Roden *et al*. (2021). The following species are listed as Positive indicator species: *Eriocaulon aquaticum*, *Littorella uniflora*, *Lobelia dortmanna*, *Myriophyllum alterniflorum*, *Isoetes lacustris*, *Callitriche hermaphroditica*, *Chara virgata*, *Nitella translucens*, *Potamogeton berchtoldii*, *Potamogeton perfoliatus*. Ten High quality (rare) indicator species are also listed: *Baldellia ranunculoides* subsp. *repens*, *Chara muscosa*, *Fissidens fontanus*, *Hydrilla verticillata*, *Isoetes echinospora*, *Najas flexilis*, *Nitella confervacea*, *Nitella spanioclema*, *Pilularia globulifera*, *Subularia aquatica*.
6.8 Additional information *Optional*	Habitat 3130 is associated with clear water (large euphotic depth) and high water quality, including naturally low dissolved nutrients and low algal growth. The habitat's ecological requirements are detailed in Roden *et al*. (2021) and in the conservation objectives for the 23 SACs designated to protect it in Ireland. The characteristic deep-water community, in particular, is highly sensitive to environmental change, notably to reduction in the amount of light reaching the lake bed, which can be caused by increased water colour, shading by larger, more vigorous rooted plants and increased phytoplankton biomass. Methods for assessing the conservation condition of the habitat are given in Roden *et al*. (2021). It is assessed under ten parameters: Area of habitat, Deep-water community, Number of species, Typical species, Slender Naiad condition, Introduced Species, Euphotic depth, Water colour, Total phosphorus and Hydrological regime. Dedicated survey between 2014 and 2024 yielded information on the condition of the habitat at 39 lakes (Lough Corrib was not used in these analyses owing to the uncertainty on the habitat's distribution and extent) (Roden & Murphy, 2014; Roden *et al.*, 2021, 2024; van Groenendael *et al*., 2020). Seventeen (43.6%) monitored lakes were assessed as in good condition (this includes one site assessed as borderline good/poor), 17 (43.6%) as poor (*Unfavourable-Inadequate*) and five (12.8%) as bad (*Unfavourable-Bad*) (Fern, Kiltooris, Leane, Nageltia and Sessiagh). In terms of area: – The surface area of the 17 lakes assessed as in good condition sums to 6.9 km^2 (11% of the monitored area) – The surface area of the17 lakes assessed as in poor condition sums to 31.8 km^2 (52% monitored area) – The surface area of the five lakes assessed as in bad condition sums to 22.6 km^2 (37% monitored area) – This gives a total surface area of 54.4 km^2 in not-good condition – The minimum areas in good (6.9 km^2), not-good (54.4 km^2) and unknown (1.5 km^2) condition sum to the reported minimum surface area of the habitat (62.8 km^2), representing 11% of reported minimum area as good, 86.7% in not-good and 2.3% unknown condition

	– The maximum areas were calculated by applying the percentages for the minimum areas to the reported maximum surface area of the habitat (356 km^2): 39 km^2 good, 309 km^2 not-good and 8 km^2 unknown. In 2023 and 2024, monitoring of Kiltooris Lough, formerly one of the most important Irish sites for the habitat, found no improvement in subsurface vegetation nor any appreciable increase in euphotic depth despite conservation measures to restore the hydrological regime, and assessed the habitat as in bad condition (Roden *et al*., 2024). Roden *et al*. (2024) also assessed habitat 3130 at Sessiagh Lough as in bad condition, owing to the replacement of the characteristic deep-water community, including the extirpation of Slender Naiad, by the large macrophytes *Elodea canadensis* and *Potamogeton perfoliatus.* Roden *et al*. (2021) assessed the conservation condition of the habitat as bad at Lough Leane, based on monitoring in 2018 and 2019 which found reduced species richness, collapse of the Slender Naiad population and the deep-water community, and shallow euphotic depths (c. 2 m). The Annex II species Slender Naiad (*Najas flexilis*) (1833) characterises habitat 3130 and is a highly sensitive species of the lower euphotic depths. The conservation status of *Najas flexilis* was assessed as *Unfavourable-Bad* for the reporting cycle 2019-2025. Owing to the large number (56.4%) and area (89%) of monitored sites in not-good condition (i.e. significantly more than 25%), and the decline in the conservation status of Slender Naiad from *Unfavourable-Inadequate* to *Unfavourable-Bad*, the habitat's Structure and functions are assessed as *Unfavourable-Bad* overall. It is noticeable that lakes where the habitat is in good condition tend to be small and in small catchments. Larger lakes and those in larger catchments are more likely to be in not-good condition. Repeat surveys using the methods of Roden *et al*. (2021) are available for only a small number of lakes, making it difficult to assess trends in habitat condition. It cannot be assumed that a 'good' condition assessment is indicative of stable conditions and, in fact, at sites such as Port Lough that were assessed as in good condition, there were indicators of negative changes, such as increased abundance and size of *Eleodea canadensis* plants. Repeat surveys in 2023 and 2024 at Kiltooris Lough demonstrated some improvements in habitat condition, however it remained in bad condition overall from 2017 to 2024. Of the 39 monitored lakes, 28 have *uncertain* short-term trends, five *stable*, one *increasing* and five *decreasing*. Over the longer term, habitat trend is considered to be *decreasing* at 20 sites, and *uncertain* or *unknown* at the remainder. Given that the area of habitat in Lough Leane is almost 20 km^2 and it has shown significant deterioration over time and, in particular, since 2013, the overall national trend in habitat condition is *decreasing*. Raw data gathered by the EPA under their water quality/WFD monitoring programmes, notably total phosphorus and water colour, are important in assessing the conservation condition of habitat 3130. Raw qualitative macrophyte data are also valuable, and the EPA has contributed many important macrophyte species records. Quantitative EPA macrophyte data are not directly comparable to

	conservation survey data, however, owing to the different survey methods used (Roden *et al*., 2021). Derived WFD data, such as 'ecological status' or 'macrophyte status' (the Irish EPA uses the 'Free Macrophyte Index' for the macrophyte 'biological quality element') cannot be used to indicate the conservation condition of habitat 3130. To illustrate, 18 of the 39 monitored lakes reported on above have WFD ecological status assessments for the period 2016-2021 based on monitoring data: ten of the 13 lakes where habitat 3130 is in *Unfavourable* (poor or bad) conservation condition, passed the WFD objective of good or high ecological status, with 11 of the 13 passing for WFD macrophyte status. Nine of the 39 monitored 3130 lakes are not mapped as lake waterbodies for the WFD third cycle (2022-2027, see https://gis.epa.ie/EPAMaps/Water) and have not been assigned WFD ecological status for the period 2016-2021. An ecological status of 'good' was assigned using modelling (11) or expert judgement (1) to the remaining lakes, nine of which were in good conservation condition and three in poor. Overall, therefore, 25 of the 30 lakes where WFD ecological status was assigned were in good or high status, a pass rate of 83%, in contrast to the conservation condition pass rate of 44% for the 39 monitored lakes. See also 2019-2024 national conservation status assessment for Slender Naiad (*Najas flexilis*) (1833).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	High
PA20 Livestock farming generating pollution	Ongoing and likely to be in the future	Majority 50-90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	High
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	High
PC08 Extraction activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium

PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Majority 50-90%	Medium
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
e) Invasive alien species of Union concern	R08062 *Lagarosiphon major,* R05501 *Elodea nuttallii*		
f) Other invasive alien species *Optional*	R05500 *Elodea canadensis,* R04306 *Crassula helmsii,* R10097 *Nymphoides peltata*		
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
7.3 Sources of information *Optional*	Slender Naiad National Conservation Assessment 2019-2024		
7.4 Additional information *Optional*	Pressures and threats were recorded in the field (Roden & Murphy, 2014; Roden *et al.*, 2021, 2024), as well as through visual examination of aerial imagery for the catchments of lakes with habitat 3130. 58 Slender Naiad lakes were examined. Potential agricultural pollution (PA17, PA20) was noted as a pressure in 61% of catchments. This includes land-use intensification through drainage, use of chemical fertilisers, slurry-spreading and over-grazing of peatland. Pollution with phosphorus and organic carbon compounds are the key issues. Forestry pollution (PB19) was noted as a potential pressure in 26% of catchments examined. Turf cutting generating water pollution (PC08) was noted as a pressure at 9% of catchments. PF07 covers discharges from both urban wastewater (UWW) treatment plants (sewered) and on-site systems (unsewered). On-site systems are potentially impacting in at least 59% of catchments examined. Urban wastewaters are significant sources of nutrients and organic matter at Sessiagh, at Lough Leane, amongst others. Drainage is a significant pressure associated with agriculture (PA22), forestry (PB24) and turf cutting (PC05) in 3130 catchments. Records reported through the Botanical Society of Britain and Ireland (BSBI) and the National Biodiversity Data Centre (NBDC) were used to identify localities with invasive species pressures.		

	See also Slender Naiad National Conservation Assessment 2019-2024 for information.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a)* Measures identified, but none yet taken *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MF04 Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures MK01 Reduce impact of mixed source pollution
8.7 Additional information *Optional*	As the pressures impacting on the habitat have been documented, the conservation measures required to maintain or restore it are broadly understood. These include: 1. reversal of drainage impacts/ restoration of hydrological regime, and 2. reducing pollution (with dissolved and/or particulate nutrients, humic substances, organic matter and fine sediment/turbidity) from agricultural, forestry, turf-cutting, golf-course and domestic and urban wastewater sources. Significant progress has been made with domestic wastewater treatment systems through inspection regimes and grant schemes. There is also on-going substantial investment by Uisce Éireann (Irish Water) in urban wastewater treatment and collection systems. It is unclear whether these measures have been taken within habitat 3130 catchments or, if they have, whether standard WFD water quality objectives have been used rather than conservation objectives (see below). With the exception of the installation of a weir in 2017 in the outflow from Kiltooris Lough following illegal drainage and closing the sluice at Sheskinmore Lough, no targeted conservation measures have been or are currently being undertaken to protect or restore the habitat within SACs. Proposals are being developed for conservation measures at Lough Leane. Implementation of the Water Framework Directive (WFD) in Ireland does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024). It contains, as an action (3.8): "The water-related requirements of water-dependant habitats and species will be reviewed by the Water Division, the National Parks and Wildlife Service and the EPA during the third RBMP cycle, taking account of the most recent scientific evidence. If necessary, proposals for updating the related water standards will be made and this will be integrated into the catchment management process." Site-specific conservation objectives for habitat 3130 in the 23 SACs designated for its protection were published between 2014 and 2021. A report detailing the ecological requirements and condition of the habitat, based on more than 20 years of work, was published in 2021 (Roden *et al*., 2021). The findings of this study were in keeping with those of previous Article 17 reports (Roden, 2007; NPWS, 2013, 2019), the published site-specific conservation objectives (NPWS, 2014-2021), and O Connor (2013, 2015).

	WFD objectives are set as either good or high ecological status for WFD waterbodies, and are based on WFD ecological status assessments alone. Of the 39 lakes with habitat 3130 monitored between 2014 and 2024 (see section 6.8), 30 are mapped and assessed lake waterbodies for the WFD third cycle (2022-2027, see https://gis.epa.ie/EPAMaps/Water). Just three of these were assigned a WFD high status objective, the remaining 27 having the objective of good status. Currently, a WFD standard exists for one of the habitat's ecological requirements, total phosphorus, specified in the habitat's conservation objectives. The target for good conservation condition is set as an average of ≤0.010 mg/l TP, which matches the ecological quality standard for WFD high status in lakes (S.I. No. 77 of 2019). In consequence, the WFD total phosphorus objective of good (≤0.025 mg/l TP) is not sufficiently stringent to achieve the targets of the Habitats Directive. An overall WFD high ecological status objective does not guarantee *Favourable* conservation condition for the habitat as targeted WFD standards do not currently exist for the other key requirements including water colour, DOC, euphotic depth, typical species and degree of development of the characteristic deep water community. Protecting and restoring 3130 lakes requires that the habitat's ecological requirements are included within WFD waterbody objectives, as a minimum for known sites within the 23 SACs designated for its protection. Three of the 39 monitored lakes are included within 'areas for action' in the third WFD cycle: Lough Leane (bad conservation condition), Nahaltora (poor) and Tully (poor). Twenty-two of the monitored lakes are in unfavourable conservation condition. In total, 517 areas for action were selected across Ireland, based on risk 'through a collaborative workshop process', for focused attention in the third-cycle, 428 of which were identified as requiring restoration as they are not currently meeting their WFD environmental objectives based on WFD ecological status assessments (DHLGH, 2024). DHLGH (2024) states: "As part of the process, priority was given to areas that linked with those outlined in the second-cycle plan, areas with a high-status objective and protected areas, such as bathing waters, shellfish waters and drinking water supply sources." WFD programmes do not, therefore, constitute adequate conservation measures to protect or restore the habitat to *Favourable* status, however any measures to reduce diffuse pollution to surface or ground waters from agricultural and residential activities (MA09, MA10, MF04, MK01) should improve water quality and have an impact on habitat condition. Agricultural measures to protect water quality are being implemented through a range of mandatory (e.g. the Nitrates Action Programme and Good Agricultural Practice Regulations) and voluntary initiatives (e.g. LAWPRO-ASAP farm advisory services, the Agri-Climate Rural Environment Scheme (ACRES) Co-operation Projects, Waters of LIFE IP, Farming for Water EIP). Enforcement has also been improved under the National Agricultural Inspection Programme, with additional staff in local authorities and the EPA. Overall, significant focus is being placed on as yet unproven source control measures (e.g.

	increased slurry storage) and pathway interception measures (e.g. buffers) rather than source reduction measures. There is also a general lack of sufficient information on nutrient sources (in terms of field-scale livestock density and applications of chemical fertilisers and slurry) and nutrient pathways (in terms of drainage channels and pipes) to develop targeted source control measures such as detailed nutrient management plans. Forestry measures for water quality are a combination of mandatory requirements and voluntary schemes. While various schemes are now available to support restructuring of plantation forests post clear-felling, no effective measures have been identified to prevent water quality impacts on high-risk sites during forest felling and forest road construction, and there are limited/no DAFM schemes available to fund either water quality mitigation measures during these operations, or to remove plantations and restore open habitats (peatland, other wetland, grassland, etc.). There is insufficient focus, therefore, on managing the large 'legacy' of inappropriately sited conifer plantations on blanket peat and other organic soils. It is noteworthy too that the restructuring options focus on creation of buffer zones and the use of continuous cover forestry, which is not yet a proven sylvicultural technique on peat and other organic soils. Planting of more intensively used agricultural land with native tree species could lead to water quality improvements, but will need to be strategically planned, spatially, and consider the risks of exacerbating droughts through evapotranspiration in the current and projected future climate scenarios. See also section 6.8 for analyses of the variation between assessment of the ecological status of lakes for WFD purposes and the conservation condition of habitat 3130 in those same lakes.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The Future prospects of the Range, Area and Structure and functions of habitat 3130 were assessed by reference to pressures and threats and conservation measures, as well as each parameter's 'future trends' and current status: *Pressures and threats:* Ten pressures were recorded and all were assessed as ongoing and likely to be in the future. Six pressures from agriculture, forestry and human wastewaters were assessed as high-influence, two from peat extraction were assessed as medium influence and two from invasive alien species were low influence. These pressures and threats result in changes in hydrological regime and water quality and, therefore, have negative impacts on the habitat's structure and functions. *Conservation measures:* Limited conservation water quality measures are currently being undertaken to protect or restore the habitat,	

	either within SACs or the wider countryside. Furthermore, implementation of the WFD in Ireland to date has not integrated the water-related ecological requirements of habitat 3130 into its objectives, status or risk assessments, plans or programmes of measures. Implementation of necessary catchment measures takes time and, once implemented, there is typically a time-lag before they take effect. Therefore conservation measures, if taken, will not halt or reverse the negative influence of the pressures and threats in the next 12 years. *Range:* The short- and long-term trends of Range were assessed as *stable*. The current range is equal to the Favourable Reference Range and considered to include 'all significant Irish ecological variations of the habitat' and to be sufficiently large to allow the long-term viability of the habitat. Therefore, the Conservation Status of Range is *Favourable*. While pressures may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3130 lakes, hence the range is unlikely to change. The future trend of Range is, therefore, likely to remain *stable* and, the Future prospects of Range have been assessed as *Good*. *Area:* The short- and long-term trends of Area were assessed as *stable*. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. Therefore, the Conservation Status of Area is *Favourable*. While pressures may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3130 lakes, hence the habitat area is unlikely to change. The future trend of Area is, therefore, likely to remain *stable*, and the Future prospects of Area have been assessed as *Good*. *Structure and functions:* The short-term trend in Structure and functions was assessed as *decreasing* owing to the decreasing trend in habitat condition at Lough Leane and four other 3130 lakes. 52% of the monitored area of the habitat was assessed as in poor condition and 37% as in bad condition, a total of 89% in not-good condition. The Slender Naiad, a characteristic typical species of the habitat has declined from *Unfavourable-Inadequate* to *Unfavourable-Bad* conservation status, with both Population and Habitat for the species assessed as *Unfavourable-Bad* and *decreasing*. Structure and functions were, therefore, assessed as *Unfavourable-Bad*. Given the negative influence of the identified pressures and threats on the status of the Structure and functions and the limited conservation measures, the predicted future trend is *negative*. As a result, the Future prospects of Structure and functions were assessed as *Bad*. As Future prospects of one of the three parameters were assessed as *Bad*, the Future prospects for the habitat were assessed as *Unfavourable-Bad*.

<table>
<tr><th colspan="3">10 Conclusions</th></tr>
<tr><td colspan="3">Assessment of conservation status at end of reporting period</td></tr>
<tr><td>10.1 Range</td><td colspan="2"><u>Favourable (FV)</u> / Inadequate (U1) / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.2 Area</td><td colspan="2"><u>Favourable (FV)</u> / Inadequate (U1) / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.3 Specific structure and functions (incl. typical species)</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.4 Future prospects</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td>a) No, there is no difference</td><td><u>a) No, there is no difference</u></td></tr>
<tr><td><u>b) yes, due to genuine change</u></td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">Range: As there is no evidence of a decline in Range since the Directive came into force (stable short- and long-term trends), the extent of the Range is equal to the Favourable Reference Range and is large at approximately 26% of the terrestrial grid, and the current range is considered to include all significant Irish ‘ecological variations of the habitat’ and to be sufficiently large to allow the long-term viability of the habitat, Range was assessed as Favourable. While there may be significant deterioration in the structure and functions of the habitat, it is unlikely that any 3130 lakes will be lost, hence, the range is unlikely to change.

Area: There is no evidence of a decline in Area since the Directive came into force (stable short- and long-term trends) and the area is large at</td></tr>
</table>

	63-356 km^2. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. As a result, Area was assessed as *Favourable*. While there may be significant deterioration in the structure and functions of the habitat, it is unlikely that any 3130 lakes will be lost, hence, the habitat area is unlikely to change. Range and Area are insensitive measures of the conservation status of lake habitats, given that lakes are damaged rather than lost, and are inappropriate parameters to use in setting targets for nature restoration and protection. Further research may demonstrate that deterioration of habitat quality can reach a point beyond which the habitat is no longer restorable and lakes where this occurs could be reported as site loss, and result in a reduction in habitat area, and possibly even range. Until then, the conservation status of lake habitats will be determined by the Structure and functions assessment. Conservation measures to protect and restore the habitat need to be implemented in terrestrial catchments. Given the magnitude, extent and expense of effective conservation measures for lake habitats, it is essential that they are prioritised and spatially focused to ensure the protection and, where possible, restoration, of the best examples of the habitat. *Structure and functions:* Dedicated monitoring of habitat 3130 and its typical species produced habitat condition/Structure and functions assessments for 39 lakes. 11% of the monitored area was assessed as in good condition, 52% of the monitored area of the habitat was assessed as in poor condition and 37% as in bad condition. The combined monitored area in not-good condition was 89%, therefore Structure and functions was assessed as *Unfavourable-Bad*. In addition, the Annex II species Slender Naiad (*Najas flexilis*) (1833), which is characteristic of habitat 3130 and one if its most sensitive indicators, was assessed as having *Unfavourable-Bad* status for the current reporting cycle. Populations of Slender Naiad have gone extinct at Sessiagh, collapsed at Lough Leane since 2012 and were in *Unfavourable* condition at 34% of lakes monitored. The short-term trend in Structure and functions was assessed as *decreasing* owing to evidence of habitat deterioration at Lough Leane, one of the largest and most important 3130 lakes, and four other 3130 lakes. *Future prospects:* Given the predicted *negative* 'future trend' and *Unfavourable-Bad* status of the habitat's Structure and functions, the pressures and threats identified, and the limited habitat-specific conservation measures, the Future prospects were assessed as *Unfavourable-Bad*. As Structure and functions and Future prospects were assessed as *Unfavourable-Bad*, the Overall Conservation Status of 3130 was assessed as *Unfavourable-Bad*. Based on dedicated surveys of habitat condition (i.e. structure and functions) between 2014 and 2024 (Roden & Murphy, 2014; Roden *et al*., 2021, 2024), the overall trend is reported as *deteriorating*.

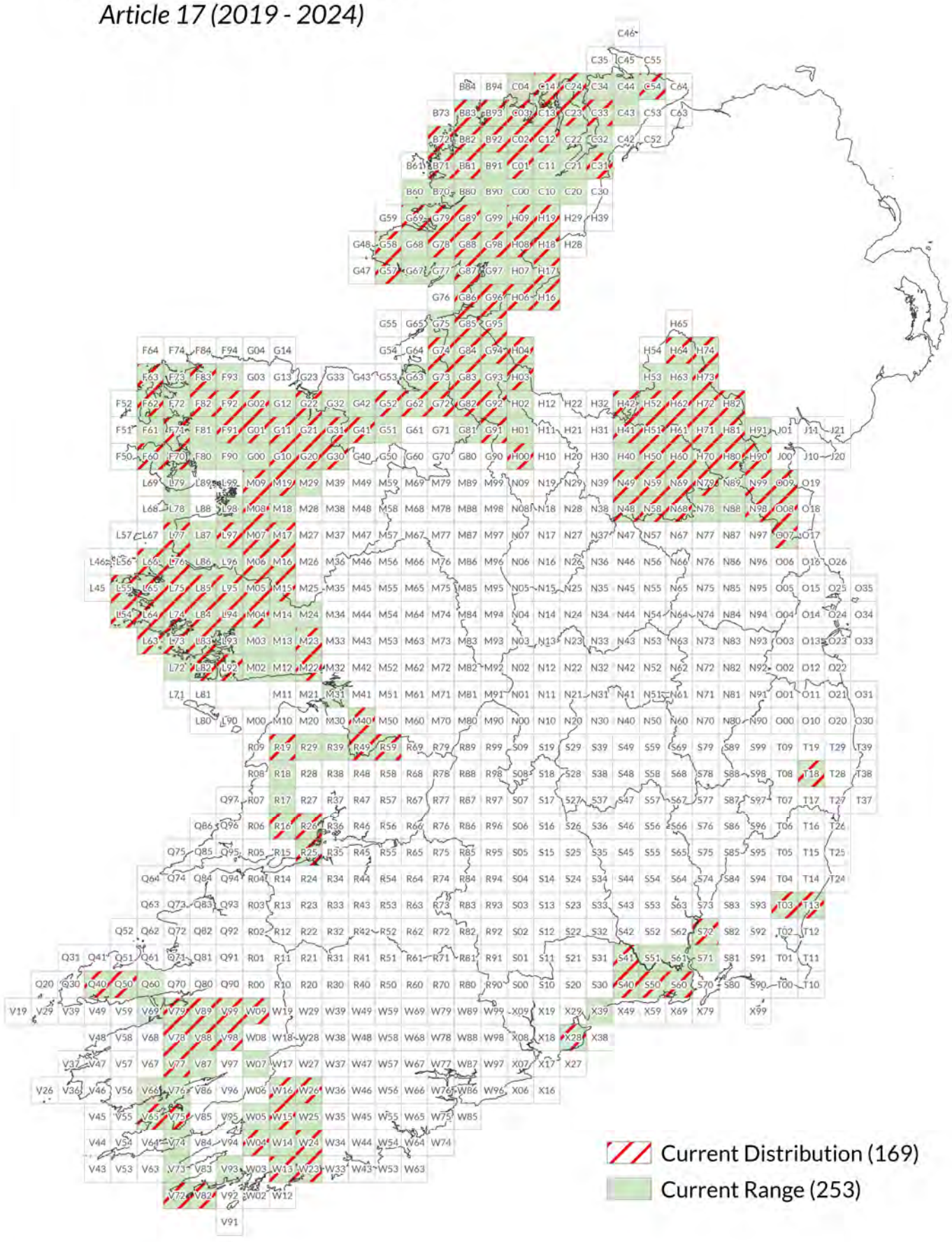
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***35.5 km²***
	b) Maximum	***259 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Estimates used the surface area of the lake polygons classified as containing the habitat. The minimum estimate summed the areas of 35 lakes with high confidence that the habitat is present, based on expert field survey, and that are within SACs designated for the protection of habitat 3130. The area of the 35 lakes sums to 3,548.18 ha, or 35.5 km².	

	The maximum estimate summed the areas of all lake segments within all SACs that are classified as having habitat 3130 (136 lake polygons with a total area of 25,862.40 ha = 259 km^2). Twenty-eight of the 39 monitored lakes are in SACs: 13 are in good condition, 11 in poor and four in bad condition (Fern, Kiltooris, Leane, Sessiagh). The total area of monitored habitat in not-good condition in SACs was 5,197 ha of the 5,736 ha (91%). Of the 28 monitored lakes, eight have *uncertain* short-term trends, four *stable*, one *increasing* (Kiltooris) and five *decreasing*. Over the longer term, habitat trend is considered to be *decreasing* at 14 sites, and *uncertain* or *unknown* at the remainder. Repeat surveys in 2023 and 2024 at Kiltooris Lough demonstrated some improvements in habitat condition, however it remained in bad condition overall from 2017 to 2024. Given that the area of habitat in Lough Leane is almost 20 km^2 and it has shown significant deterioration over time and, in particular, since 2013, the overall trend in habitat area in good condition within the network is *decreasing*.

12 Complementary information *N/A*

Slender Naiad-type lakes (3130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.**
1.2i Habitat short name	**Hard-water lakes**
1.3i Habitat description	The hard-water lake habitat (Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. 3140) is strongly associated with lowland lakes over limestone bedrock. It is also found on calcareous sand at the landward side of machair plains and in canals. The habitat is dominated by primitive organisms, particularly the macroalgal group stoneworts (*Chara* spp.). Stonewort diversity is high and includes a number of rare and threatened species. Irish examples of the habitat are also of international importance for their 'krustenstein', an organic crust found on bedrock and cobbles in shallow waters. The characteristic depth-related vegetation zonation described from Irish hard water lakes has up to six distinct, stonewort-dominated zones. Higher plants are generally at low abundance and restricted to the *Chara subspinosa* (*rudis*) zone and sheltered shorelines. Marl lakes in good condition have exceptionally clear water with stoneworts growing to depths of 10 m or more. Ireland has some of the best, most representative examples of the habitat in Europe and the world. Habitat 3140 is also widespread in Ireland, occurring in a large number and variety of sites including large stony lakes, turloughs, dune slacks, fens and canals. As a result, Ireland has particular responsibility for restoring this natural habitat at favourable conservation status within the EU. The hard-water lake habitat is under significant pressure from eutrophication, the primary sources of nutrients and organic matter being agriculture and municipal and industrial wastewaters.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2000-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution of habitat 3140 in Ireland is based on the 2013-2018 Article 17 distribution. Site-specific conservation objective (SSCO) mapping shapefiles published in April 2022 were used to update these data, as well as new lake vegetation data (*e.g*. Roden *et al*., 2022, 2024; Stewart, 2023). As in 2019, the distribution is a hybrid dataset of lake polygons mapped at two scales: 1:50,000 (WFD Lake Segments) and 1:5,000 (site-specific conservation objectives), plus canals with habitat 3140. NPWS (2013, 2019) and O Connor (2015) provide details on the 2013-2018 and 2007-2012 Article 17 mapping. Following revision, the 2019-2024 distribution is based on 608 lake segments* and seven canal segments occupying a total of 210 10x10 km grid cells. The increase from the 195 10x10 km grid cells reported for 2013-2018 is the result of: – Surveys of Lough Derg by Cilian Roden and others over a number of years (Roden *et al.*, 2022) which demonstrated the presence of characteristic 3140 vegetation including charophytes and cyanobacterial crust, notably near Clery's Point. The inclusion of Lough Derg in the distribution results in an additional seven 10x10 km grid cells (M70, M80, R89, R78, R88, R67, R77) – Surveys by Roden *et al.* (2024) in Roscommon (M65, Kiltullagh Lough; M64, Summerville Lough), Galway (M51, Kinlea Lough) and Donegal (B93, Sand ponds on Corgannive Glebe) – Surveys by Roden *et al.* (2022, 2023) of Lough Nahinch, Co. Tipperary (R99) – Information on Mall Lough, Co. Laois (S48) and Eagle Lough, Co. Cork (R50, R51) (N.F. Stewart, pers. comm.) – In addition, two 10x10 km grid cells were added from the SSCOs: M40 for Lough Briskeen and G51 for Killawee Lough – Three 10x10 km grid cells (G69, 679 and G84) were removed from the distribution owing to the use of SSCO data, however G69 was added back in owing to the presence of the habitat in the dune slack pools at Sheskinmore. (*In general, a GIS lake segment corresponds to a single lake) Confidence in habitat classification is high for the approximately 70-80 lakes, and the canals, with field survey data, but is low for many of the other lakes classified as 3140, where classification was based on geological and other mapping data. The habitat is distributed across 23 counties (Cavan, Clare, Cork, Donegal, Dublin, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Westmeath and Wexford). The inclusion of data at a different map scale (1:5,000) may lead to small differences between reporting periods, as shoreline geometry and lake segment area vary between map bases.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	BSBI (2023) Ireland's Changing Flora. *A Summary of the Results of Plant Atlas 2020*. Botanical Society of Britain and Ireland. https://plantatlas2020.org/sites/default/files/bsbi_data/home/BSBI%20Plant%20Atlas%202020%20summary%20report%20Ireland%20WEB.pdf. DHLGH (2024) Water Action Plan 2024. A River Basin Management Plan for Ireland. Government of Ireland. https://www.gov.ie/en/campaigns/0f55e-river-basin-management-plan/. Doddy, P. (2019) Cyanobacterial Communities in Limestone Lakes & Pools in Ireland: Effects of nutrient enrichment on community structure, and implications for conservation of marl lakes. Unpublished PhD thesis, Galway-Mayo Institute of Technology. Doddy, P., Roden, C.M. & Gammell, M.P. (2019) Microbialite crusts in Irish limestone lakes reflect lake nutrient status. *Biology and Environment: Proceedings of the Royal Irish Academy,* 119(1), 1–11. Doddy, P., Roden, C.M. & Gammell, M.P. (2019) Nutrient-pollution degrades microbialites in Lough Carra, an Irish marl lake. *Aquatic Microbial Ecology,* 83, 203–20. Foster, G. N., Nelson, B. H. & O Connor, Á. (2009) *Ireland Red List No. 1 – Water beetles.* National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. https://www.npws.ie/publications/red-lists. LCCA (Lough Carra Catchment Association) (2024) Lough Carra Emergent Vegetation Baseline Survey (2023) A report prepared for the Carra LIFE project LIFE20 NAT/IE/000172. NBDC Biodiversity Maps https://maps.biodiversityireland.ie/Map. Nelson, B., O Connor, Á., Foster, G.N., Doddy, P. & Roden, C. (2019) A review of *Ochthebius nilssoni* Hebauer (Coleoptera: Hydraenidae) in western Ireland including a first report from Lough Carra. *Irish Naturalists' Journal,* 36(2), 117–122. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/Article_17_Print_Vol_2_report_habitats_v1_1_0.pdf. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS

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4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***31,200 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*
4.3 Short-term trend Period	***2013-2024***
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*

4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 31,200 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*

	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current distribution of the habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 312 10x10 km grid cells. As explained at section 2.5, the 2019-2024 distribution is based on 608 lake segments and seven canal segments occupying a total of 210 10x10 km grid cells: seventeen 10x10 km grid cells were added and three removed from the distribution reported for the 2013-2018 cycle based on improved knowledge. The consequence of these changes in the mapped distribution is that the range has increased by 3,200 km^2 since the last reporting cycle. There is no evidence of a decline in the Range of habitat 3140. Lake habitats suffer damage as a result of hydrological and morphological change, decreased water clarity, eutrophication and other impacts, but are seldom destroyed. The result is that the Range of lake habitats remains *stable*. As there is no evidence of a decline in Range since the Directive came into force, the extent of the range is large at approximately 36% of the (87,700 km^2) terrestrial grid and the habitat is widespread (found in 23 counties), it is assumed that the current range includes all significant Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat. Therefore, the current range is set as the Favourable Reference Range.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	***281 km^2***
	b) Maximum	***548 km^2***
	c) Best single value	
5.3 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	

5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 281 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ ***Other*** *(Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The distribution was used to estimate habitat area, following the approach used for the 2007-2012, and 2013-2018 reporting cycles (NPWS, 2013, 2019; O Connor, 2015). Estimates used the surface area of the lake and canal polygons classified as containing the habitat. The minimum estimate (281 km^2) summed the areas of 77 lake segments, plus the canals, where field data indicate the occurrence of habitat 3140. Confidence is high in the habitat classification for some of these, where survey was conducted by experts, however confidence	

	is lower in others that were included based on interpretation of available macrophyte records. The maximum estimate (54,767.1 ha = 547.67 km^2) summed the surface area of the 608 lake segments identified in the distribution as containing habitat 3140 (54,291.72 ha = 542.92 km^2), plus the area of the canal segments (475.37 ha = 4.75 km^2). Unlike for the 2007-2012 and 2013-2018 cycles, an estimate of the area of unclassified lake segments was not included in the maximum area (NPWS, 2013, 2019; O Connor, 2015). Unclassified segments contributed less than 5% of the maximum area estimate in 2019. Given the low confidence in the classification of many of the 608 lakes (see section 2.5), 548 km^2 is considered likely to be a significant overestimate of the area of the habitat in Ireland. In addition, the area of habitat 3140 may be less than the surface area of a lake, particularly where more than one Annex I standing water habitat occurs. Alternatively, where habitat 3140 occupies the entire available lake, it may cover an area greater than that of the surface of the lake. The estimated area reported for the 2013-2018 cycle was 283-464 km^2. The increase in the maximum estimate to 548 km^2 is largely a result of the inclusion of Lough Derg (116.5 km^2). The inclusion of 1:5,000 site-specific conservation objective data also changes the surface areas reported for individual lakes. There is no evidence of a decline in Area since the Directive came into force and the estimated minimum surface area is considered sufficient to ensure the long-term viability of the habitat type. As a result, the estimated minimum surface area is set as the Favourable Reference Area.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***18 km²***
		Maximum	***21 km²***
	b) Area in not-good condition	**Minimum**	***148 km²***
		Maximum	***342 km²***
	c) Area where condition is not known	**Minimum**	***115 km²***
		Maximum	***190 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		

6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO*
6.7 Typical species Method used *Optional*	There have been minor updates to the typical species list following publication of Roden *et al*. (2020): the addition of *Nitella tenuissima* and *Myriophyllum alterniflorum,* the removal of widespread emergent lake species *Phragmites australis* and *Schoenoplectus lacustris*, and the highlighting of typical species indicative of good conservation condition (see section 6.8 below)
6.8 Additional information *Optional*	The marl lake or hard-water habitat has an unusual flora, vegetation and fauna, which is very restricted in Europe and globally, and Ireland contains a significant proportion of the total European habitat. The habitat is associated with high water quality, i.e. the absence of eutrophication impacts: naturally low dissolved nutrients, very clear water (large euphotic depth) and low phytoplankton growth (for further information, see Roden & Murphy, 2013; Roden *et al*., 2020, 2022, 2024; Roden & O Connor, 2024). Methods for assessing the conservation condition of the habitat are given in Roden *et al*. (2020). It is assessed under 11 parameters: Area of habitat, number of vegetation zones, Euphotic depth, Crust cover, Crust chlorophyll a, Crust chlorophytes, charophyte and crust score, lake level, Water colour, Total phosphorus and a TP-colour Index regime. Dedicated survey between 2012 and 2024 yielded information on the condition of the habitat at 44 lakes (Doddy, 2019; Doddy *et al*., 2019; Roden & Murphy, 2013, 2022, 2024; Roden & Ryan, 2022; Roden *et al*., 2020, 2022, 2023, 2024; Stewart, 2023; Stewart *et al*., 2024). Seventeen (39%) monitored lakes were assessed as in good (*Favourable*) condition, 18 (41%) as poor (*Unfavourable-Inadequate*) and nine (20%) as bad (*Unfavourable-Bad*). At six of the 44 lakes monitored, there is some uncertainty on the former extent and quality of habitat 3140, notably at Loughs Mask and Derg, where condition is severely degraded (Roden *et al*., 2022). When these are removed from the analysis, 17 (45%) sites were in good condition, 14 (37%) poor and seven (18%) bad. Based on 2018 charophyte survey work of N.F. Stewart in the canals, the Grand Canal and Barrow Navigation were assessed as in good condition, and the Royal Canal was assessed as in poor condition owing to the failure to re-find *Tolypella intricata*, the widespread and

	abundant filamentous algae in the stretches in and near Dublin and the widespread occurrence of the alien invasive *Elodea nuttallii*. Areas were calculated based on the 38 lake sample for minimums and the 44 lake sample plus the canals for maximums: – The surface area of the lakes assessed as in good condition sums to 18.26 km^2, and with the canals to 21.06 km^2 – The surface area of lakes assessed as in poor condition sums to 137 km2 (136.69-137.05 km^2), with the canals to 139 km^2 – The surface area of the lakes assessed as in bad condition sums to 10.81-204 km^2 (the removal of Loughs Derg and Mask accounts for the large difference between the minimum and maximum estimates) – This gives a total surface area of 148-342 km^2 in not-good condition (89-95% of the area monitored) – The minimum areas in good (18 km2), not-good (148 km^2) and unknown (115 km^2) condition sum to the reported minimum surface area of the habitat (281 km^2), representing 6.5% of reported minimum area good, 52.5% not-good and 41% unknown – The maximum areas in good (21 km^2), not-good (342 km^2) and unknown (185 km^2) condition sum to the reported maximum surface area of the habitat (548 km^2), representing 4% of reported maximum area good, 62% not-good and 34% unknown It is reasonable to assume, however, that the sample of lakes monitored are representative of all 3140 lakes and, therefore, that 89-95% (250-488 km^2) are in not-good condition. Lakes (e.g. Lough Carra (Roden & Murphy, 2024) and Lough Bunny (Roden *et al*., 2024)) where repeat monitoring and conservation condition assessments are available show little change since 2011. As a result, the short-term trend in the habitat's Structure and functions is assessed as *stable*. Repeat monitoring has focused on a small number of the highest quality lakes and is, therefore, skewed towards those in better condition. This could mask deterioration in condition elsewhere. Since the 1990s, there is clear evidence of a decreasing trend in Structure and functions at marl lakes such as Corrib and Carra (Roden & Murphy, 2013, 2024; Roden *et al*., 2020). It is noteworthy that deteriorating lakes are frequently larger, in larger catchments and have significant river inflows. While condition was assessed as good at Loughs Owel and Bunny in 2011, 2018, and again at Bunny in 2023 (Roden & Murphy, 2013; Roden *et al*., 2020, 2024), there are indications of episodes of poor condition including green algae over-growing the crust and coloured water. Regular monitoring and investigation is needed to determine if these indicate an overall, gradual decline. Very low water levels have also been recorded at Loughs Owel and Bane during the reporting cycle, both of which are drinking water supplies. The relative importance of the drivers of low water levels (abstraction and low precipitation levels linked to climate change) has not yet been elucidated. Water Framework Directive (WFD) status assessments cannot be used to indicate the conservation condition of 3140 lakes. Examining the

	WFD data for the 27 lakes assessed as in not-good conservation condition, out of the 44 monitored between 2012 and 2024: 12 lakes were also monitored under WFD, nine of which were assessed as good WFD ecological status and three as moderate status. In total, of the 27 lakes that fail conservation condition assessment, 14 (52%) are at good WFD status, seven (26%) are at moderate WFD status, and six (22%) have no WFD status assigned. Three of the 21 lakes assigned a WFD status have a high WFD status objective, and all are at risk of failing to achieve that. The typical species list of the hard-water lake habitat in Ireland is dominated by algae (Roden & Murphy, 2013; Roden *et al*., 2020). Roden *et al*. (2020) noted that species present in all marl lakes in good condition include *Chara curta, Chara subspinosa* (*rudis*)*, Chara virgata*; other widespread species include *Chara aculeolata, Chara aspera, Chara contraria, Chara virgata* var. *annulata*, more local species are *Chara hispida*, *Chara dissoluta* (*denudata*), *Chara tomentosa* and *Nitella tenuissima*. The typical plant species are cyanobacterial crust/Krustenstein, *Ophrydium versatile, Oscillatoria, Chara aculeolata, Chara aspera, Chara contraria, Chara curta, Chara dissoluta* (*denudata*)*, Chara globularis, Chara subspinosa* (*rudis*)*, Chara virgata, Nitella flexilis, Nitella tenuissima*, *Littorella uniflora, Myriophyllum alterniflorum, Potamogeton gramineus, Potamogeton* x *nitens, Potamogeton perfoliatus,* and *Utricularia vulgaris* agg. The vulnerable water beetle, *Ochthebius nilssoni* is also characteristic (Foster *et al*., 2009; O'Callaghan *et al*., 2009; Nelson *et al*., 2019). In addition, a characteristic water beetle fauna of vegetation rafts in hard-water lakes includes *Agabus unguicularis, Hydroporus angustatus, Hydroporus memnonius, Hydroporus planus, Hydroporus striola, Hydroporus tessellatus, Hydroporus umbrosus, Ilybius ater, Ilybius guttiger, Ilybius quadriguttatus, Cercyon convexiusculus, Coelostoma orbiculare, Anacaena limbata, Anacaena lutescens, Hydrobius fuscipes* agg.*, Enochrus coarctatus,* and *Enochrus testaceus.*

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	High
PA20 Livestock farming generating pollution	Ongoing and likely to be in the future	Majority 50-90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Majority 50-90%	High
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Majority 50-90%	High

PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Medium
PC08 Extraction activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF17 Active abstraction of water for built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Majority 50-90%	Low

e) Invasive alien species of Union concern	R05501 *Elodea nuttallii* R08062 *Lagarosiphon major*
f) Other invasive alien species *Optional*	*Azolla filiculoides, Crassula helmsii, Elodea canadensis, Hottonia palustris, Nitella mucronata, Nitellopsis obtusa, Stariotes aloides, Corbicula fluminea, Dreissena polymorpha, Dreissena rostriformis bugensis*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	
7.4 Additional information *Optional*	The pressures and threats reported for the 2007-2012 and 2013-2018 cycles were reviewed against data from dedicated 3140 and charophyte surveys during this reporting cycle (Roden *et al.*, 2022, 2024; Stewart, 2023, Stewart *et al*., 2022, etc.). In addition, reference was made to the 2022-2027 River Basin Management Plan under the Water Framework Directive. The 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024) and included an assessment of significant pressures impacting on water bodies. Agriculture is reported as impacting 85 lake water bodies, Other pressures impact 50, unknown pressures impact 26, hydromorphology 15, forestry 14, urban wastewater ten, domestic wastewater nine, urban run-off three, peat two and industry one. It was not possible to readily access the WFD pressures and impacts data for specific lakes, so analyses could not be conducted to distinguish the pressures impacting on 3140. Pollution with dissolved and particulate nutrients and organic matter, from agriculture and human wastewaters, is the most significant

	pressure impacting habitat 3140. Pollutants from disturbed peatland, notably dissolved and particulate organic matter, increased water colour and fine sediment, also impact on the habitat. Agricultural practices that increase the sources of pollution, and/or create more direct pathways to water, include the application of chemical fertilisers, slurry spreading, high stocking rates, land reclamation, drainage and drain maintenance, ploughing and re-seeding. PF07 covers discharges from both urban waste water (UWW) treatment plants (sewered) and on-site systems (unsewered). Urban waste waters, as well as other point-sources, are discharged to tributaries of 3140 lakes, including Loughs Corrib, Mask, Ennell and the Shannon system. Forestry and peat extraction in catchments with areas of deep peat result in pollution with dissolved and particulate organic matter and nutrients, and high-water colour (e.g. Loughs Derravarragh, Errit, Urlaur) (Roden *et al*., 2020). Abstractions for drinking water (PF17) are common from 3140 lakes, owing to their high water quality and proximity to urban areas. Very low water levels were recorded in Lough Owel in 2017, 2018 and 2024-2025. Very low levels were also recorded in Lough Bane in 2024-2025, a lake that was previously impacted by over-abstraction in 2006-2007 (Roden, 2008, 2009, 2010; Roden *et al*., 2020). Low water levels were also noted in 2024 in some marl lakes that are not public drinking water supplies. In consequence, it appears that climate change (PJ03), as well as abstraction is driving hydrological change. Further analysis is needed to elucidate the relative contributions of the two pressures (abstraction and drought) to the low water levels. The impacts of low water levels on krustenstein and charophyte communities needs to be monitored. As well as exacerbating the impacts of abstractions, climate change is expected to exacerbate eutrophication problems through increased delivery of pollutants during storm events, concentration of nutrients in droughts and increased primary production with higher temperatures and more sunshine (Taylor *et al*., 2022). Invasive alien species have been noted as colonising the habitat, notably *Elodea nuttallii* in Lough Arrow and the canals. Large numbers and abundances of non-native invasive species occur in Lough Corrib (*Lagarosiphon major, Elodea nuttallii, Crassula helmsii*) and Lough Derg (*Azolla filiculoides, Elodea canadensis, Hottonia palustris, Nitella mucronata, Nitellopsis obtusa, Stariotes aloides, Corbicula fluminea, Dreissena polymorpha, Dreissena rostriformis bugensis*). Invasive behaviour has also been recorded in native vascular plants, e.g. *Myriophyllum verticillatum* in Lough Carra. The invasive response of these non-native and native species is believed to be driven by environmental disturbance (predominantly eutrophication) in all cases. Owing to their likely continuation, all pressures are also listed as threats (ongoing and likely to be in the future). No genuine changes in pressures or threats were identified.

	NPWS (2013, 2019) and O Connor (2015) detailed how habitat-specific information, documented pressures on general water quality, and expert judgement were used to determine the pressures on lake habitat in the 2007-2012 and 2013-2018 reporting cycles.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019-2024)* ***b) Medium-term response (within the next two reporting periods, 2025-2036)***

	c) Long-term response (after 2036)
8.6 List of main conservation measures	MA10, Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MA13, Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MF04, Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures
8.7 Additional information *Optional*	Lough Carra LIFE [LIFE20 NAT/IE/000172] is a five-year project (2021 to 2026) working with farmers, other landowners, and local community groups to improve water quality and restore the marl Lake habitat. The project's actions are taking place within the Lough Carra/Mask Complex SAC (001774) and in the wider Lough Carra catchment. MA10 covers the project's results-based agri-environment scheme. MA13 covers Lough Carra LIFE actions through the results-based scheme and its work with OPW on drain management. MF04 covers the project's action to construct a treatment wetland at the visitor attraction of Moorehall. Significant progress has been made with domestic wastewater treatment systems through inspection regimes and grant schemes. There is also on-going substantial investment by Uisce Éireann (Irish Water) in urban wastewater treatment and collection systems. It is unclear whether these measures have been taken within 3140 catchments or, if they have, whether standard WFD water quality objectives ('good status') have been used rather than conservation objectives (see below). Implementation of the Water Framework Directive (WFD) in Ireland does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024). It contains, as an action (3.8): "The water-related requirements of water-dependant habitats and species will be reviewed by the Water Division, the National Parks and Wildlife Service and the EPA during the third RBMP cycle, taking account of the most recent scientific evidence. If necessary, proposals for updating the related water standards will be made and this will be integrated into the catchment management process." Site-specific conservation objectives for habitat 3140 in the 19 SACs designated for its protection were published between 2015 and January 2022. Reports detailing the ecological requirements and condition of the habitat, incorporating data from more than 20 years of work, were published 2020 (Roden *et al*., 2020). The findings of these studies were in keeping with those of previous Article 17 reports (Roden & Murphy, 2013; NPWS, 2013, 2019), the published site-specific conservation objectives (SSCO) (NPWS, 2015-2022), and O Connor (2015). WFD objectives are set as either good or high ecological status for WFD waterbodies, and are based on WFD ecological status assessments alone (see https://gis.epa.ie/EPAMaps/Water). Many 3140 lakes are small and a large percentage has no WFD status or

	objective. As noted in section 6.8, six of the 27 lakes assessed as in not-good conservation condition between 2012 and 2024 have no WFD status assigned and, therefore, no WFD objective. An analysis of the 3140 SAC lakes in published SAC SSCO spatial data (April 2022) showed that 70% (*c*. 83 lakes) do not have WFD status or objectives. Of the 3140 SAC lakes with WFD status, <15% (4-5 individual lakes) were assigned a high status target, the remainder having a good status target that allows annual average total phosphorus concentrations of up to 0.025 mg/l TP. Currently, total phosphorus is the only parameter with both WFD standards and SSCO targets. The target for good conservation condition for habitat 3140 is an average of ≤0.010 mg/l TP, which matches the ecological quality standard for WFD high status in lakes (S.I. No. 77 of 2019). It should be noted, however, that the average total phosphorus is significantly lower than 0.010 mg/l TP in many high quality 3140 lakes (see Roden *et al*., 2020). In consequence, the WFD total phosphorus objective of good (≤0.025 mg/l TP) is not sufficiently stringent for 3140 lakes and could allow further deterioration in habitat condition to occur. Although 3140 lakes require total phosphorus levels equivalent to WFD high nutrient status, an overall WFD high ecological status objective is not recommended, because it is a) unnecessary as, for example, habitat 3140 is unlikely to require high WFD fish status to restore/maintain *Favourable* conservation condition, and b) does not guarantee *Favourable* conservation condition for the habitat as targeted WFD standards do not currently exist for the other key requirements including water colour, number of charophyte zones, euphotic depth, cyanobacterial crust cover and condition and lake level. Protecting and restoring individual 3140 lakes to *Favourable* condition requires that the habitat's ecological requirements are included within WFD waterbody objectives. Achieving *Favourable* conservation status for the habitat nationally will require significant conservation measures in the catchments of 3140 lakes, which cover a large percentage of the land area of Ireland. Voluntary measures under agricultural schemes (e.g. Agri-Climate Rural Environment Scheme (ACRES) Co-operation Projects, European Innovation Partnerships, LIFE projects) are ongoing and may contribute towards improving water quality.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The Future prospects of the Range, Area and Structure and functions of habitat 3140 were assessed by reference to pressures and threats and conservation measures, as well as each parameter's 'future trends' and current status:	

	Pressures and threats: Twelve pressures were identified and all were assessed as ongoing and likely to be in the future. These pressures and threats result in changes in water quality and hydrological regime and, therefore, have negative influence on the status of the habitat's structure and functions. Agricultural and wastewater pressures, in particular, are widespread, affecting the majority of the habitat, and have high influence. Climate change is considered likely to be already impacting the habitat and is expected to further exacerbate eutrophication, abstraction and invasive species pressures. *Conservation measures:* Concrete conservation measures are being implemented by the Lough Carra LIFE project to restore the habitat to *Favourable* condition in Lough Carra. Limited other measures are currently being undertaken to contribute towards the maintenance, restoration or enhancement areas of 3140 habitat, either within SACs or the wider countryside. Furthermore, implementation of the WFD in Ireland to date has not integrated the water-related ecological requirements of the habitat into its objectives or programmes of measures. Identification and implementation of necessary catchment measures takes time and there is typically a time-lag before they take effect. Ensuring measures are taken across a catchment and are sufficient to restore a lake to *Favourable* condition is also challenging. Therefore conservation measures, if taken, will not halt or reverse the negative influence of the pressures and threats in the next 12 years. *Range:* The short- and long-term trends of Range are *stable*. The current range is equal to the Favourable Reference Range and includes 'all significant Irish ecological variations of the habitat' and is sufficiently large to allow the long-term viability of the habitat. Therefore, the Conservation Status of Range is *Favourable*. While threats may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3140 lakes, hence the range is unlikely to change and the future trend of Range is *stable*. The Future prospects of Range are, therefore, assessed as *Good*. *Area:* The short- and long-term trends of Area are *stable*. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. Therefore, the Conservation Status of Area is *Favourable*. While threats may lead to significant deterioration in the structure and functions including increased fluctuations in water levels, they are unlikely to result in measurable losses in 3140 area and the reported area will continue to be calculated using standard lake maps. In consequence, there will be no significant change in reported area and the future trend of Area is *stable*. The Future prospects of Area are, therefore, assessed as *Good*. *Structure and functions:* At least 53-62% of the habitat area is in not-good condition, or 89-95% if figures for the monitored area are extrapolated to the total area. The Structure and functions are, therefore, assessed as *Unfavourable-Bad*. The short-term trend in Structure and functions is assessed as *stable*, based on repeat monitoring of high conservation 3140 lakes. These lakes are assessed as in good and *stable* condition but do show indications of possible gradual decline that should be monitored. The use of data from such

	lakes may mask deterioration in condition elsewhere. There is clear evidence of *decreasing* 3140 Structure and functions since the 1990s. Considering the ongoing pressures and increasing threat of climate change exacerbating those pressures, the future trend of Structure and functions is assessed as *negative*. The Future prospects of the Structure and functions are, therefore, assessed as *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	***d) yes, due to the use of different method***
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */unknown/ other reasons*
10.8 Additional information *Optional*	*Range:* As there is no evidence of a decline in Range since the Directive came into force (*stable* short- and long-term trends), the extent of the Range is equal to the Favourable Reference Range and is large at approximately 36% of the terrestrial grid, and the current range is	

	considered to include all significant Irish 'ecological variations of the habitat' and be sufficiently large to allow the long-term viability of the habitat, Range is assessed as *Favourable*. While there may be significant deterioration in the structure and functions of the habitat, it is unlikely that any 3140 lakes will be destroyed; hence, the range is unlikely to change. *Area:* There is no evidence of a decline in Area since the Directive came into force (*stable* short- and long-term trends) and the area is large at 281 km^2-548 km^2. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. As a result, Area was assessed as *Favourable*. While significant deterioration in the structure and functions of the habitat occur, it is unlikely that there will be measurable losses in 3140 area; hence, the habitat area is unlikely to change. Range and Area are insensitive measures of the conservation status of lake habitats, given that lakes are damaged rather than destroyed. Further research may demonstrate that deterioration of habitat quality can reach a point beyond which the habitat is no longer restorable and lakes where this occurs may be reported as site loss, and result in a reduction in habitat area, and possibly even range. Until such time, range and area will continue to be based on standard lake maps, and the overall conservation status and trend of lake habitats will be determined by the Structure and functions assessment. Conservation measures to protect and restore the habitat need to be implemented in terrestrial catchments. Given the magnitude, extent and expense of effective conservation measures for lake habitats, it is essential that they are prioritised and spatially focused to ensure the protection and, where possible, restoration, of the best examples of the habitat. *Structure and functions:* Dedicated monitoring of habitat 3140 and its typical species produced habitat condition/Structure and functions assessments for 44 lakes and the canals between 2012 and 2024. From these data, 53-62% of the habitat area is in not-good condition, or, if figures for the monitored areas are extrapolated to the total area, 89-95% of the habitat area is in not-good condition. The Structure and functions are, therefore, assessed as *Unfavourable-Bad.* *Future prospects:* Given the ongoing *Unfavourable-Bad* status of Structure and functions, the ongoing pressures and increasing threat of climate change exacerbating those pressures, and the insufficient habitat-specific conservation measures, the future trend of Structure and functions is *negative* and the habitat's Future prospects are assessed as *Unfavourable-Bad.* *Overall status:* As Structure and functions and Future prospects are assessed as *Unfavourable-Bad*, the Overall Conservation Status of 3140 is *Unfavourable-Bad*. *Overall trend:* In line with the Article 17 Explanatory Notes, the overall trend is assessed as *stable* as the short-term trends in Range, Area and Structure and functions are reported as *stable*. As noted above, Range and Area trends cannot change, owing to both the methods used and because lakes are not destroyed or significantly reduced in size. The short-term trend in Structure and functions is assessed as *stable* based

	on limited data for this reporting cycle for high conservation value lakes where changes in condition were assessed as not significant. For the last reporting cycle, more data were available and expert opinion was used to conclude the short-term trend in Structure and functions was *decreasing*. There is no evidence of a genuine change in the short-term trend in Structure and functions, and the long-term trend is *decreasing*.

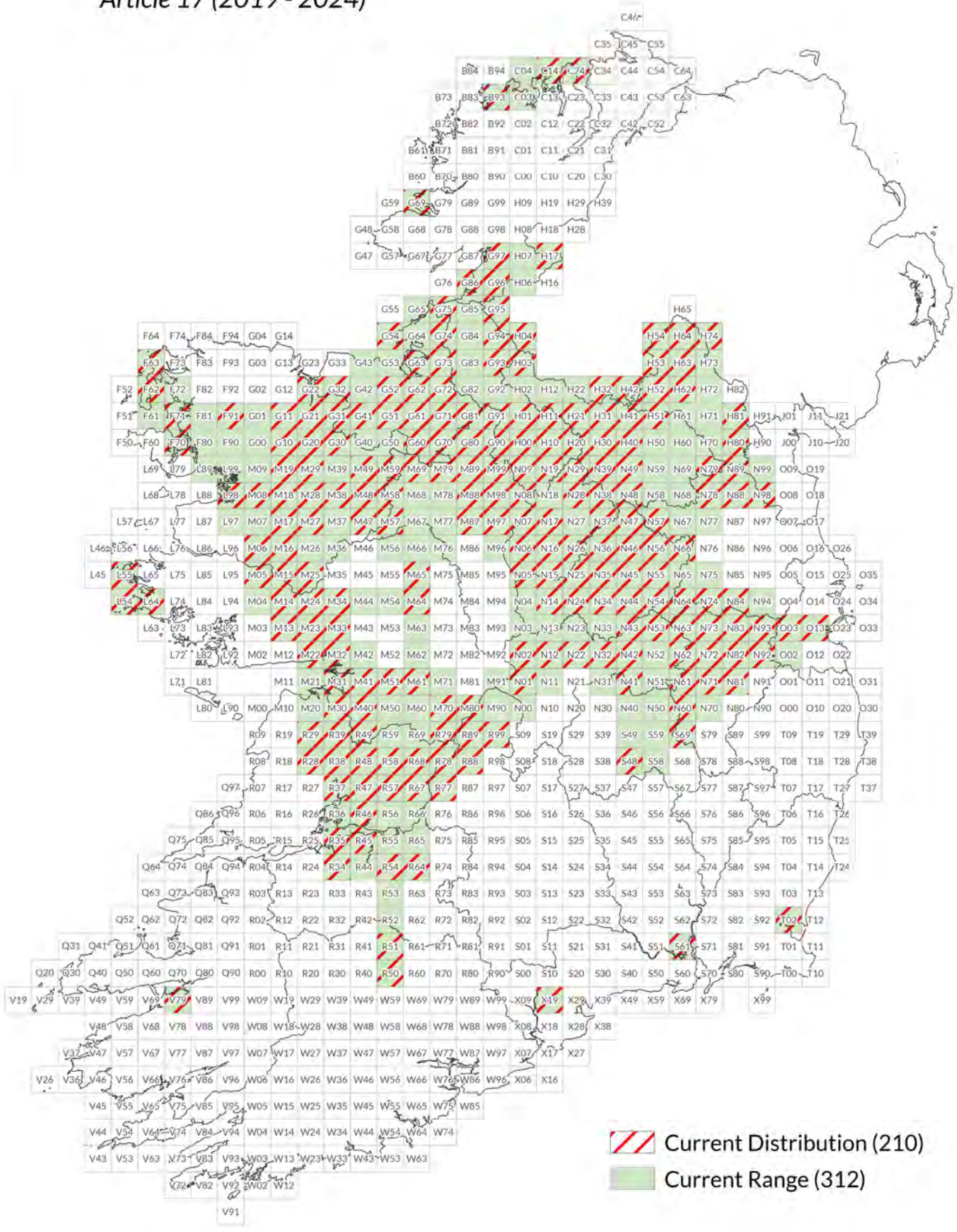
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***238 km²***
	b) Maximum	***334 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	

11.8 Additional information *Optional*	The distribution was used to estimate habitat area in SACs, following the approach used for the 2007-2012 and 2013-2018 cycles (NPWS, 2013b; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. As the 3140 canals are not within the SAC network, canals were not included in the calculations. The minimum estimate summed the areas of the lake segments that are within SACs designated for the protection of habitat 3140 (23,800.18 ha, 238.18 km^2). The maximum estimate summed the surface area of all lake segments within any SAC identified in the distribution as containing habitat 3140 (33,369.38 ha, 333.69 km^2). The areas are larger than those reported, using the same methods, in 2013-2018: minimum estimate (225 km^2), maximum estimate (315 km^2), as a result of additional SSCO mapping. The limited available repeat monitoring and conservation condition assessments used to inform the overall short-term trend in Structure and functions are for lakes in 3140 SACS (see section 6.8 for further information). As a result, the *stable* short-term trend of habitat area in good condition within the network (section 11.6) is the same as the general short-term trend of habitat area in good condition (section 6.4).

12 Complementary information *N/A*

Hard-water lakes (3140)

Article 17 (2019 - 2024)



NPWS
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National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation**
1.2i Habitat short name	**Rich pondweed lake habitat**
1.3i Habitat description	Little is known about the characteristics or ecology of Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation in Ireland. Roden & O Connor (2024) said that it can clearly be distinguished from habitat 3130 by the absence of the oligotrophic isoetid zones and the rarities of the deep-water zone, and from 3140 by the lower abundance of stoneworts, and suggested targeting lakes with rich pondweed floras or Frogbit (*Hydrocharis morsus-ranae*) to better elucidate its characteristics. Habitat 3150 is considered likely to occur in lowland, base-rich lakes in the midlands and north-east of Ireland, and to be characterised by high abundance and diversity of pondweeds (*Potamogeton* spp.), such as *Potamogeton lucens*, *P. praelongus*, *P. perfoliatus*, *P. obtusifolius*, *P. berchtoldii* and *P. pectinatus*. Other rooted, predominantly submerged higher plants may regularly co-occur, including *Myriophyllum spicatum*, *Hippuris vulgaris*, *Callitriche* spp., *Sagittaria sagittifolia* and *Ceratophyllum demersum*, while free-floating species such *Lemna trisulca* are also likely to be common. The habitat is thought likely to be associated with large lakes in large catchments, such as those of the Shannon system, and with small, but naturally more productive lakes, such as those found in parts of the drumlin belt of Cavan, Monaghan and Leitrim, or the lowlands south-east of the Burren. The pondweed-rich variant found in Ireland is considered to require mesotrophic waters, and to typically have well-developed reed swamp, fen and/or marsh communities around the lake shoreline. Wet woodland may have been more important in the past and has survived or re-colonised patches of many 3150 lake shores. Lakes with habitat 3150 are associated with catchments dominated by mineral soil and, hence, some of the most intensive agricultural lands in Ireland. Consequently, the habitat has been under pressure from eutrophication since the 1970s or before. It may, therefore, represent an altered state, caused by anthropogenic enrichment of habitats that in their natural or reference condition would have conformed to habitat 3140, 3130 or 3110.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2000-2024***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution of habitat 3150 in Ireland is based on the 2013-2018 Article 17 distribution. Site-specific conservation objective mapping shapefiles published in April 2022 were used to update these data, as well as some lake vegetation data (*e.g*. Roden *et al*., 2021, 2022 2024; N.F. Stewart, pers. comm.). As in 2019, the distribution is a hybrid dataset of lake polygons mapped at two scales: 1:50,000 (WFD Lake Segments) and 1:5,000 (site-specific conservation objectives). NPWS (2013, 2019) and O Connor (2015) provide details on the 2013-2018 and 2007-2012 Article 17 mapping. Following revision, the 2019-2024 distribution is based on 569 lake segments* occupying a total of 90 10x10 km grid cells. Two 10x10 km grid cells were added (M48, R28) to the 2013-2018 distribution and one removed (G61) based on the site-specific conservation objectives data and Roden *et al*. (2024) and other data. (*In general, a GIS lake segment corresponds to a single lake.) The habitat is distributed across 14 counties (Cavan, Clare, Galway, Leitrim, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Roscommon, Sligo, Tipperary and Westmeath). Confidence in the distribution is low, as the majority of lakes were classified as 3150 based on geological and other mapping data. Field survey is necessary to confirm the habitat's distribution and to improve understanding of its typical species, ecological variation and the impacts that result from anthropogenic pressures. The inclusion of data at a different map scale (1:5,000) may lead to small differences between reporting periods, as shoreline geometry and lake segment area vary between map bases.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-

3.4 Sources of information	DHLGH (2024) Water Action Plan 2024. A River Basin Management Plan for Ireland. Government of Ireland. https://www.gov.ie/en/campaigns/0f55e-river-basin-management-plan/. Duigan, C.A., Kovach, W.L. & Palmer, M. (2006) *Vegetation communities of British Lakes: a revised classification.* Joint Nature Conservation Committee, Peterborough. Duigan, C., Kovach, W. & Palmer, M. (2007) Vegetation communities of British lakes: a revised classification scheme for conservation. *Aquatic conservation: Marine and Freshwater Ecosystems,* 17, 147–173. Free, G., Little, R., Tierney, D., Donnelly, K. & Coroni, R. (2006) A reference-based typology and ecological assessment system for Irish lakes. Preliminary Investigations. Final Report. Project 2000-FS-1-M1 Ecological Assessment of Lakes Pilot Study to Establish Monitoring Methodologies EU (WFD). EPA, Wexford. Heuff, H. (1984) The Vegetation of Irish Lakes. Parts 1 and 2. Unpublished Report to the Wildlife Service, Office of Public Works, Dublin. https://www.npws.ie/sites/default/files/publications/pdf/Heuff_1984_Lake_Vegetation_1.pdf and https://www.npws.ie/sites/default/files/publications/pdf/Heuff_1984_Lake_Vegetation_2.pdf. NBDC Biodiversity Maps https://maps.biodiversityireland.ie/Map. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/Article_17_Print_Vol_2_report_habitats_v1_1_0.pdf. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf. NPWS Flora Protection Order Viewer https://www.npws.ie/maps-and-data/npws-flora-protection-order-2022-map-viewer-vascular-plants-charophytes-and-lichens. O Connor, Á. (2015) Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/Lake_habitats_supporting_document_Nov_2015_V1.1_FINAL.pdf. O Connor, Á. (2016) Incorporating nature conservation objectives and measures into the Water Framework Directive. *Biology and Environment: Proceedings of the Royal Irish Academy*, 116B(3), 329-337. doi:10.3318/bioe.2016.29. Palmer, M.A., Bell, S.L. & Butterfield, I. (1992) A botanical classification of standing waters in Britain: applications for

conservation and monitoring. *Aquatic conservation: Marine and Freshwater Ecosystems,* 2, 125-143.

Preston, C.D. & Croft, J.M. (2001) *Aquatic Plants in Britain and Ireland*. Harley Books, Colchester.

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Roden, C., Murphy, P. & Ryan, J.B. (2021) A study of lakes with Slender Naiad (*Najas flexilis*) – Appendix V Site Reports. *Irish Wildlife Manuals*, No. 132. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland https://www.npws.ie/sites/default/files/publications/pdf/IWM132%20Appendix%20V.pdf.

Roden, C., Murphy, P., Ryan, J. & Flynn, O. (2024) Survey and monitoring of lake habitats and Slender Naiad in 2023 and 2024. Report to the National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/Lake_Surveys_2023_2024_DL_GY_MO_RN_CE_Roden_et_al_2024.pdf.

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Stroh, P.A., Walker, K.J., Humphrey, T.A., Pescott, O.L. & Burkmar, R.J. 2023. *Plant Atlas 2020. Mapping Changes in the Distribution of the British and Irish Flora*. 2 volumes. Botanical Society of Britain and Ireland and Princeton University Press. https://plantatlas2020.org/index.php/ and BSBI Distribution Database https://bsbi.org/maps-and-data.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***11,100 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*		
4.9 Long-term trend Direction *Optional*		
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*		

<table>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 11,100 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current distribution of the 3150 habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 121 10x10 km grid cells. Following review, ten 10x10 km grid cells were removed as the habitat does not occur within them, based on geology, soils and the presence of other standing water habitat within the lakes. The 10x10 km grid cells removed from the range were: M50, M60, M58, M59, R39, R55, R56, R59, R65 and R69. The final range contains 111 10x10 km grid cells, the same number as in 2013-2018, but with small changes in geometry owing to updated distribution (see section 2.5).

There is no evidence of a decline in the range of habitat 3150. Lake habitats suffer damage as a result of hydrological and morphological change, decreased water clarity, eutrophication and other impacts, but are seldom destroyed. The result is that the Range of lake habitats remains stable.

It is considered that 3150 may not be a natural habitat in Ireland, but rather result from anthropogenic pressures impacting on other Annex I lake habitats. Therefore, it is assumed that the current range includes all significant Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat. As a result, the current range was set as the Favourable Reference Range.</td></tr>
</table>

5 Area covered by habitat			
Area covered by the habitat type within the range in the biogeographical/marine region concerned			
5.1 Year or period	***2019-2024***		
5.2 Surface area *(in km²)*	**a) Minimum**	***148 km²***	
	b) Maximum	***385 km²***	
	c) Best single value		
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*		
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*		
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*		
5.6 Short-term trend Period	***2013-2024***		
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*		
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**		
	b) Estimated Maximum		
	c) Pre-defined range		
	d) Unknown		
5.9 Short-term trend Magnitude Type of estimate			

5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*		
5.12 Long-term trend Direction *Optional*		
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*		
5.15 Favourable reference area	***a) 148 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information	The distribution was used to estimate habitat area, following the approach used for the 2007-2012 and 2013-2018 cycles (NPWS, 2013,	

Optional	2019; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. The minimum estimate (14793.12 ha, 148 km^2) summed the areas of lake segments within the nine SACs designated for the protection of habitat 3150 (i.e. SACs where 3150 is a Qualifying Interest). Even the minimum value may significantly overestimate the actual area of the habitat, because: – Confidence in the distribution of the habitat is low, – Even where field survey data indicate that the habitat occurs, it may be an anthropogenically impacted state of another Annex I lake habitat of higher conservation value, and – The habitat area is likely to be far less than the surface area of the lake, as vegetation does not cover the entire substratum of these lakes, and some were classified as containing more than one Annex I standing water habitat (3150 with 3130, 3140 or 3180). The maximum estimate summed the area of all 569 lake segments identified as containing habitat 3150 (38,463 ha 385 km^2). Unlike for the 2007-2012 and 2013-2018 cycles, an estimate of the area of unclassified lake segments was not included in the maximum area (NPWS, 2013, 2019; O Connor, 2015). Unclassified segments contributed *c*. 3% of the maximum area estimate in 2019. Given the low confidence in the classification of the 569 lakes (see section 2.5), and because the habitat is unlikely to cover an entire lake area and may co-occur with other Annex I lake habitats, 385 km^2 is considered to be a significant overestimate of the Area of the habitat in Ireland. Area was reported as 144-394 km^2 for the 2013-2018 reporting cycle. The small differences in the estimated areas reported are the result of the use of a different map base (1:5,000 scale) and improved knowledge of the distribution of lake habitats. There is no evidence of a decline in area since the Directive came into force and the estimated minimum surface area is considered sufficient to ensure the long-term viability of the habitat type. As a result, the estimated minimum surface area is set as the Favourable Reference Area.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***104 km²***
		Maximum	***221 km²***
	b) Area in not-good condition	**Minimum**	***27 km²***
		Maximum	***117 km²***
	c) Area where condition is not known	**Minimum**	***17 km²***
		Maximum	***47 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***
6.7 Typical species Method used *Optional*	O Connor (2015) and NPWS (2013) list the following typical species: *Callitriche* spp., *Ceratophyllum demersum, Chara* spp., *Hippuris vulgaris, Lemna gibba, Lemna minor, Lemna trisulca, Myriophyllum spicatum, Nuphar lutea, Potamogeton berchtoldii, P. filiformis, P. friesii, P. gramineus, P. lucens, P. natans, P. obtusifolius, P. pectinatus, P. perfoliatus, P. praelongus, P. pusillus, P.* x *zizii, Sagittaria sagittifolia, Sparganium emersum, Spirodela polyrhiza.* The non-native *Elodea canadensis* is also frequent in habitat 3150.
6.8 Additional information *Optional*	No dedicated monitoring programme exists for lake habitat 3150 in Ireland and a standard method for assessing its conservation condition at individual sites has not been developed. Evidence-based 3150-specific targets need to be established for water quality and other ecological drivers. It is assumed, however, that the pondweed-rich variant of habitat 3150 native to Ireland is associated with naturally mesotrophic waters (NPWS, 2013, 2019; O Connor, 2015). Structure and functions were assessed, following the approach used for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015), by examining WFD water quality data for lakes with habitat 3150. A target of mesotrophic (or WFD 'good status') or better was used. EPA data for Macrophyte, Phytoplankton and Nutrient Conditions were examined. WFD status is categorised as high, good, moderate, poor or bad. For Structure and functions to be considered to be in *Favourable* condition, all three elements had to reach at least good status. If one or more WFD element was in moderate, poor or bad status, conservation condition was assessed as not-good condition. Unlike for the 2007-2012 and 2013-2018 cycles, no attempt was made to separate 'in not-good condition' into poor and bad, owing to the large

	uncertainties. Areas were based on the surface areas of lakes classified as 3150. The minimum areas in good, not-good and unknown condition used data for the 108 lakes classified as 'potential 3150' in SACs designated for the habitat, with a total area of 148 km^2. Nineteen of the SAC lakes are EPA WFD monitoring lakes. Five of the WFD monitored lakes, with a total surface area of 104 km^2, were assessed as in good (*Favourable*) condition and 14, with a surface area of 27 km^2, in not-good condition. The remaining 17 km^2 was assessed as in *unknown* condition. This equates to 70% by area (5% by number of sites) in good condition, 18% of area (13% of sites) in not-good condition, and 12% of area (82% of sites) unknown. The maximum areas used data for the 569 lakes classified as 'potential 3150' with a total surface area of 385 km. Sixty of the 569 lakes were monitored under WFD. Nine of the monitored lakes, with a total surface area of 221 km^2, were assessed as in good (*Favourable*) condition and 51, with a surface area of 117 km^2, in not-good condition. The remaining 47 km^2 is in unknown condition. This equates to 57.4% by area (<2% by number of sites) in good condition, 30.4% area (9% sites) in not-good condition, and 12.2% area (89% sites) unknown. WFD macrophyte status was less than good at 46 of 59 monitored lakes, phytoplankton status was less than good at 25 of 60 monitored lakes and nutrient condition status was less than good at 46 of 60 monitored lakes. Structure and functions were assessed as *Unfavourable-Inadequate* overall, because 18-30.4% of the monitored area was assessed as in not-good condition, and confidence in the assessment is low, given the poor knowledge of the distribution, ecology, conservation-value and water quality requirements of habitat 3150, including the applicability of WFD tools to assessing its conservation condition. It should be noted that dedicated monitoring and assessment of lake habitats 3130 and 3140, and the Slender Naiad have found that derived WFD data, such as 'ecological status' or 'macrophyte status' cannot be used as an indicator of conservation condition (for further information, see Roden *et al*., 2020, 2021; and 2019-2014 conservation status assessments of 3130, 3140 and Slender Naiad (1833)). In Ireland, habitat 3150 may represent an altered state caused by anthropogenic impacts on habitats that in their natural or reference condition would have conformed to habitat 3140, 3130 or 3110. It may not, however, be possible to restore these natural habitats, and alternative objectives and targets may need to be identified. Changes in WFD macrophyte status and reported trends in chlorophyll *a* and total phosphorus between 2007-2021 were examined for the 19 WFD monitored lakes in SAC (https://gis.epa.ie/EPAMaps/Water). Macrophyte status appeared to be stable at 14, improving at two and uncertain at three lakes. Chlorophyll *a* trends were reported as downwards at 12 lakes and upwards at seven, while Total phosphorus trends were downwards at ten, upwards at eight and no trend was reported for the final lake. On balance, and owing to the large uncertainties as to the applicability of these WFD data, the short-term

	trend in 3150 is reported as *uncertain* and no long-term trend is reported. Typical species are listed above in section 6.7. Further work is required to fully describe the typical and characteristic species of habitat 3150, particularly *Potamogeton*, *Chara* and *Callitriche* species, the natural variations in the habitat in Ireland and how the habitat changes as a result of anthropogenic impacts. Roden & O Connor (2024) recommend targeting lakes with rich pondweed floras or Frogbit (*Hydrocharis morsus-ranae*) to better elucidate the habitat's characteristics.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	High
PA20 Livestock farming generating pollution	Ongoing and likely to be in the future	Majority 50-90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PC08 Extraction activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PL06 Physical alteration of water bodies (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	R08062 *Lagarosiphon major,* R05501 *Elodea nuttallii*
f) Other invasive alien species *Optional*	*Azolla filiculoides, Crassula helmsii, Elodea canadensis, Hottonia palustris, Lemna minuta, Nitella mucronata, Nitellopsis obtusa, Stariotes aloides, Corbicula fluminea, Dreissena polymorpha, Dreissena rostriformis bugensis*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data*

	c) Based mainly on expert opinion with very limited data *d) Insufficient or no data available*
7.3 Sources of information *Optional*	
7.4 Additional information *Optional*	Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024) and included an assessment of significant pressures impacting on water bodies. Agriculture is reported as impacting 85 lake water bodies, other pressures impact 50, unknown pressures impact 26, hydromorphology 15, forestry 14, urban wastewater ten, domestic wastewater nine, urban run-off three, peat two and industry one. It was not possible to readily access the WFD pressures and impacts data for specific lakes, so analyses could not be conducted to distinguish the pressures impacting on 3150. These data, along with pressures reported for the 2013-2018 cycle, were used to identify pressures (NPWS, 2019). Note *Stariotes aloides* is considered native in Lough Oughter, but alien and invasive at Lough Derg. *Hottonia palustris* is considered an invasive alien throughout the Republic of Ireland.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken* *If no, a justification must be provided in free text field 8.7*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ **<50%** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*

	d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA10, Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MB10, Reduce diffuse or point source pollution to surface or ground waters (incl. marine) from forestry activities MF04, Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures
8.7 Additional information *Optional*	Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024). Although there has been no dedicated study of habitat 3150, and its distribution, characteristics, typical species and ecological requirements have not yet been elucidated, it is assumed here that WFD measures will protect the habitat. Under Ireland's Water Action Plan, work is ongoing to develop pilot Catchment Action Work Plans to identify further specific measures, where necessary, which will then be rolled out across Ireland's 46 catchments. In addition, Sectoral Action Work Plans are being developed to manage the implementation of measures for key sectors including agriculture, urban wastewater discharges and forestry. Agricultural measures to protect water quality are being implemented through a range of mandatory (e.g. the Nitrates Action Programme and Good Agricultural Practice Regulations) and voluntary initiatives (e.g. LAWPRO-ASAP farm advisory services, the Agri-Climate Rural Environment Scheme (ACRES) Co-operation Projects, Waters of LIFE IP, Farming for Water EIP). Enforcement has also been improved under the National Agricultural Inspection Programme, with additional staff in local authorities and the EPA. Overall, significant focus is being placed on as yet unproven source control measures (e.g. increased slurry storage) and pathway interception measures (e.g. buffers) rather than source reduction measures. There is also a

	general lack of sufficient information on nutrient sources (in terms of field-scale livestock density and applications of chemical fertilisers and slurry) and nutrient pathways (in terms of drainage channels and pipes) to develop targeted source control measures such as detailed nutrient management plans. Forestry measures for water quality are also a combination of mandatory requirements and voluntary schemes. While various schemes are now available to support restructuring of plantation forests post clear-felling, no effective measures have been identified to prevent water quality impacts on high-risk sites during forest felling and forest road construction, and there are limited/no DAFM schemes available to fund either water quality mitigation measures during these operations, or to remove plantations and restore open habitats (peatland, other wetland, grassland, etc.). There is insufficient focus, therefore, on managing the large 'legacy' of inappropriately sited conifer plantations on blanket peat and other organic soils. It is noteworthy too that the restructuring options focus on creation of buffer zones and the use of continuous cover forestry, which is not yet a proven sylvicultural technique on peat and other organic soils. Planting of intensively used agricultural land with native tree species could lead to water quality improvements, but will need to be strategically planned, spatially, and consider the risks of exacerbating droughts through evapotranspiration in the current and projected future climate scenarios. The Water Action Plan commits to on-going substantial investment by Uisce Éireann Irish Water in urban waste water treatment and collection systems, including storm water overflows. It is noteworthy that construction of new housing in high-demand areas of Ireland is heavily dependent on the provision of drinking and waste water services by Uisce Éireann and may influence the prioritisation of resources in space and time. Significant progress continues to be made with domestic waste water treatment systems through the inspection regime (under the Domestic Waste-Water Treatment Regulations) and associated grant schemes and advisory services. LAWPRO catchment scientists continue to investigate significant and unknown pressures, and work is ongoing by DHLGH and EPA to implement a system for regulating water abstractions. Option c) "Part of measures identified have been taken" was used owing to the reliance on voluntary measures and because important measures such as the Sectoral and Catchment Action Work Plans are under development but not yet implemented. It is also unclear whether WFD measures implemented to date have been within the catchments of 3150 lakes. In addition, and as noted above, it is uncertain whether standard WFD measures will be sufficient for the requirements of habitat 3150. Implementation of the Water Framework Directive (WFD) in Ireland does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. To ensure appropriate measures are implemented for lake habitats, their site-specific conservation objectives and ecological

	requirements, as well as specific information on their conservation condition and impacting pressures, need to be included within the WFD and other policies and programmes that aim to protect and restore water quality and quantity.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The Future prospects of the Range, Area and Structure and functions of habitat 3150 were assessed by reference to pressures and threats and conservation measures, as well as each parameter's 'future trends' and current status: *Pressures and threats:* Nine widespread pressures were identified and all were assessed as ongoing and likely to be in the future. These pressures and threats result in changes in water quality, hydrological regime and morphology and, therefore, have negative influence on the status of the habitat's structure and functions. *Conservation measures:* Limited conservation measures are currently being undertaken to maintain, restore or enhance areas of 3150 habitat, either within SACs or the wider countryside. It is assumed, however that measures under the WFD will protect the habitat's water quality. Implementation of catchment measures takes time and, once implemented, there is typically a time-lag before they take effect. Therefore WFD measures, if taken in the catchments of 3150 lakes, will not halt or reverse the negative influence of the pressures and threats in the next 12 years. *Range:* The short-term trend in Range was assessed as *stable*. The current range is equal to the Favourable Reference Range and considered to include 'all significant Irish ecological variations of the habitat' and to be sufficiently large to allow the long-term viability of the habitat. Therefore, the Conservation Status of Range is *Favourable*. The future trend of Range is, therefore, likely to remain *stable* and the Future prospects of Range have been assessed as *Good*. *Area:* The short-term trend in Area was assessed as *stable*. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. Therefore, the Conservation Status of Area is *Favourable*. The future trend of Area is, therefore, likely to remain *stable* and the Future prospects of Area have been assessed as *Good*. While pressures may lead to significant deterioration in the structure and functions of the habitat, they are unlikely to result in the loss of any 3150 lakes, hence the range and area are unlikely to change. *Structure and functions:* The short-term trend in Structure and functions was assessed as *uncertain*. Based on WFD data, 18-30.4% of the monitored area was assessed as in not-good condition, therefore	

	Structure and functions were assessed as *Unfavourable-Inadequate*. As a result, the Future prospects of Structure and functions were assessed as *Poor*. As the Future prospects of one of the three parameters were assessed as *Poor*, the Future prospects for habitat 3150 were assessed as *Unfavourable-Inadequate*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating / stable /* ***unknown***	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	***f) yes, due to other reasons***
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data / the use of a different method /unknown/* ***other reasons***
10.8 Additional information *Optional*	As for previous Article 17 Reports, there was no dedicated monitoring of habitat 3150 during the reporting cycle.	

	Range: As there is no evidence of a decline in Range since the Directive came into force, the short-term trend was *stable*, the current range is equal to the Favourable Reference Range, the range is considered to include all significant Irish 'ecological variations of the habitat' and to be sufficiently large to allow the long-term viability of the habitat, Range is assessed as *Favourable*. While there may be deterioration in the structure and functions of the habitat, it is unlikely that any 3150 lakes will be lost, hence, the range is unlikely to change. *Area:* There is no evidence of a decline in Area since the Directive came into force, the short-term trend was *stable* and the area is large at 148-385 km^2. The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and considered sufficient to ensure the long-term viability of the habitat type. As a result, Area is assessed as *Favourable*. While there may be deterioration in the structure and functions of the habitat, it is unlikely that any 3150 lakes will be lost, hence, the habitat area is unlikely to change. Range and Area are insensitive measures of the conservation status of lake habitats, given that lakes are damaged rather than lost, and are inappropriate parameters to use in setting targets for nature restoration and protection. Further research may demonstrate that deterioration of habitat quality can reach a point beyond which the habitat is no longer restorable and lakes where this occurs could be reported as site loss, and result in a reduction in habitat area, and possibly even range. Until then, the conservation status of lake habitats will be determined by the Structure and functions assessment. Conservation measures to protect and restore the habitat need to be implemented in terrestrial catchments. Given the magnitude, extent and expense of effective conservation measures for lake habitats, it is essential that they are prioritised and spatially focused to ensure the protection and, where possible, restoration, of the best examples of the habitat. *Structure and functions:* WFD status data for macrophytes, phytoplankton and nutrient conditions from 60 lakes were used to assess the Structure and functions of habitat 3150. 18%-30.4% of the monitored area was assessed as in not-good condition. Structure and functions are, therefore, assessed as *Unfavourable-Inadequate*. The short-term trend in Structure and functions is assessed as *uncertain*. *Future prospects:* Given the *Unfavourable-Inadequate* status of the habitat's Structure and functions, and continuing pressures, Future prospects of the habitat are assessed as *Unfavourable-Inadequate*. As both Structure and functions and Future prospects are assessed as *Unfavourable-Inadequate*, the Overall Conservation Status of 3150 is assessed as *Unfavourable-Inadequate*. Confidence in this assessment is low, given the poor knowledge of the distribution, ecology, conservation-value and ecological requirements of habitat 3150. In addition, WFD status data have not proved reliable indicators of the conservation condition of other lake habitats and species. The majority of lakes included in the distribution were classified as 3150 based on geological and other mapping data. Dedicated field survey is needed to describe the habitat, its typical species, ecological variants, ecological requirements and responses to

	anthropogenic pressures. Work is also needed to test the applicability of the WFD status data used above. In Ireland, habitat 3150 may represent an altered state caused by anthropogenic impacts to habitats that in their natural or reference condition would have conformed to habitat 3140, 3130 or 3110. It may not, however, be possible to restore these natural habitats, and alternative objectives and targets may need to be identified. Owing to the low confidence in the use of WFD status data in the assessment of Annex I lake habitats, the overall trend in Structure and functions is assessed as *uncertain* and, given that trends in Range and Area have not proved useful for assessing the conservation status of freshwater habitats and species, the overall trend is assessed as *unknown*.

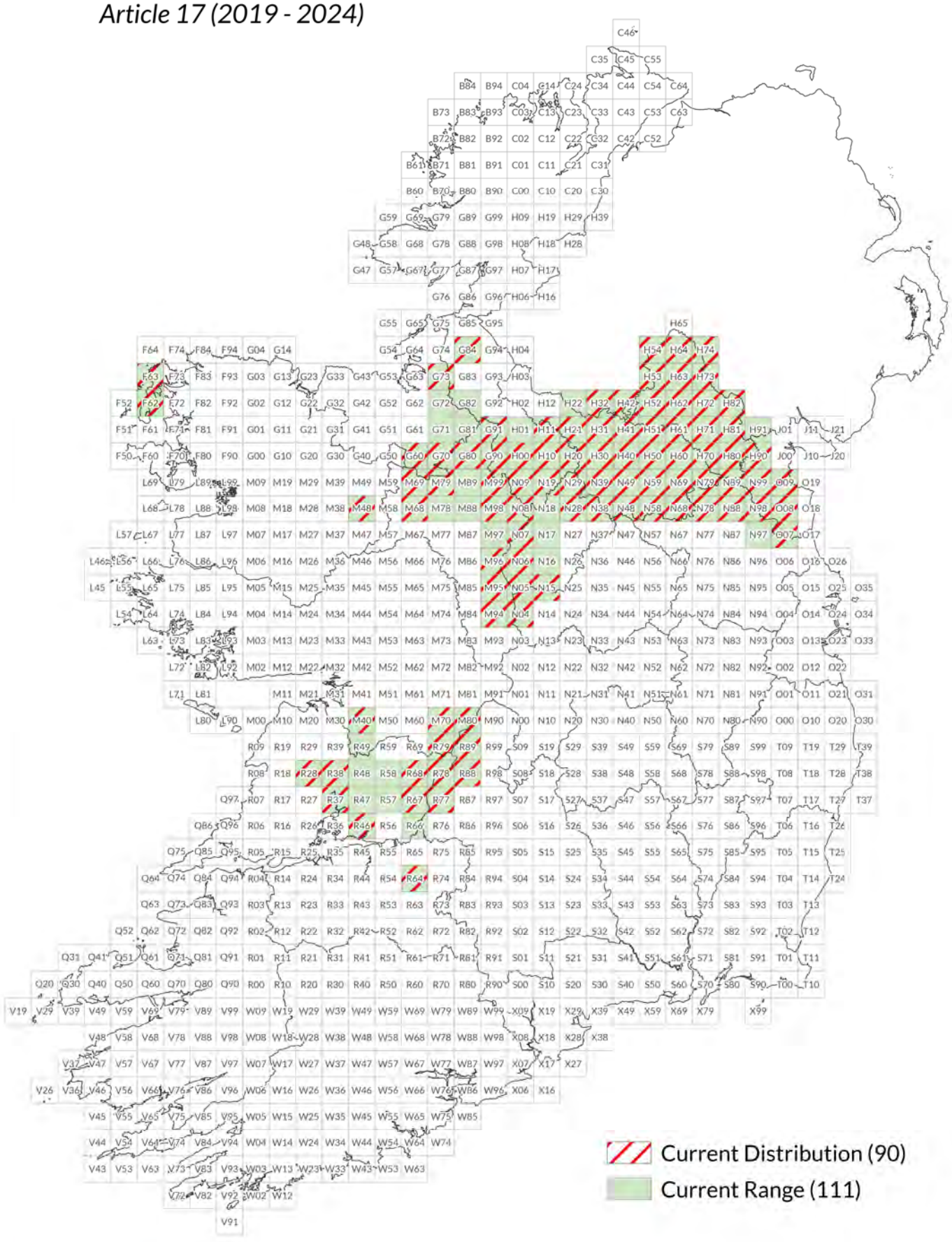
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***148 km²***
	b) Maximum	***178 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*	

11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	Estimates of 3150 habitat in SACs used the surface area of the lake polygons classified as containing the habitat. The minimum estimate (14,793.12 ha, 148 km^2) summed the areas of lake segments within the nine SACs designated for the protection of habitat 3150 (i.e. SACs where 3150 is a Qualifying Interest) and is, therefore, the same as the figure reported at 5.2 a). The maximum estimate summed the areas (17,750.69 ha = 177.5 km^2) of all 115 lake segments within SACs that were classified as having habitat 3150. See section 6.8 for additional information on the assessment of Structure and functions/area in good condition.

12 Complementary information *N/A*

Rich pondweed lake habitat (3150)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**3160 Natural dystrophic lakes and ponds**
1.2i Habitat short name	**Acid oligotrophic lakes**
1.3i Habitat description	The Natural dystrophic lakes and ponds habitat (3160), or acid oligotrophic lake habitat, is mainly found in small lakes and pools in a mosaic with Atlantic and upland blanket bog and wet heath. As for other ombrotrophic peatland habitats, habitat 3160 is species-poor botanically, but has relatively greater invertebrate species richness. It also has high algal diversity, notably in desmids. Additionally, while individual pools or lakes may be species poor, among-site variation means that the habitat displays higher species richness at landscape and regional scales. Some of the typical 3160 invertebrate, bryophyte and algal species are strongly associated with and sometimes restricted to the habitat. The habitat also shows strong regional variation across its Irish range, with altitude, geology, and distance from the sea the most likely drivers of this. Lakes and pools with habitat 3160 are dominated by Coleoptera (water beetles), followed by Trichoptera (caddisfly larvae) and Heteroptera (aquatic bugs, such as water boatmen) and have abundant Odonata (dragonflies and damselflies). Damage to peatland results in hydrological changes in dystrophic lakes and pools, as well as increased sedimentation, colour, turbidity, organic material and ammonia. Fertilisation of forests can contribute to enrichment of the habitat. Conservation measures to restore raised bog have resulted in the creation of new 3160 pools, however these may be temporary, and be replaced by active raised bog communities through natural succession.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2000-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution of habitat 3160 in Ireland is based on the 2013-2018 Article 17 distribution (see NPWS, 2013, 2019; O Connor, 2015). Recent lake data, particularly from the PeAT lakes project (Cappelli, 2024; Cappelli *et al*., 2023; Gray, 2022; Lally *et al*., 2025) were used to update the habitats assigned to some lake segments. As in 2019, the distribution is a hybrid dataset of lake polygons mapped at two scales: 1:50,000 (WFD Lake Segments) and 1:5,000 (site-specific conservation objectives). The current distribution is 140 10x10 km grid cells. A total of 13,036 lakes and pools are mapped as 3160 and are found within 134 10x10 km grid cells, exactly the same distribution as in 2013-2018. Conservation measures to restore active raised bog habitat in Ireland have led to the creation of new 3160 pools on some raised bogs. Based on available information, the following six 10x10 km grid cells were added to the distribution for 3160 pools on raised bog: 1. N33 – Cloncrow Bog 2. N37 – Ardagullion Bog 3. N68 – Killyconny Bog 4. N77 – Girley Bog 5. R99 – Scohaboy Bog 6. S48 – Abbeyleix Bog It is likely that, in most cases, these pools will not be permanent features, but with succession will become active raised bog ecotopes over time. The habitat is distributed across 18 counties (Cavan, Clare, Cork, Donegal, Dublin, Galway, Kerry, Laois, Leitrim, Longford, Louth, Mayo, Meath, Sligo, Tipperary, Waterford, Westmeath and Wicklow).

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Cappelli, G. (2024) Physico-chemical characterisation and biological communities assessment of protected dystrophic lake habitats in Ireland: Determining their conservation needs. Unpublished PhD Thesis, Atlantic Technological University. Cappelli, G., Gray, E., Gammell, M., Roden, C. & Lally, H. (2023) Physico-chemical characterisation of protected lake habitats: a matter of dystrophy, *Limnologica*, doi:https://doi.org/10.1016/j.limno.2023.126123.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***19,500 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / **increasing** / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***4.0%***
	b) Estimated Maximum	***4.0%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate** / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*		
4.9 Long-term trend Direction *Optional*		
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*		

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 18,700 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">18,700 km²</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current distribution of the 3160 habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 195 10x10 km cells.

Unlike the other Annex I lake habitat types that occur in Ireland (3110, 3130, 3140 and 3150), 3160 pools can be lost through damage and degradation of peatland, and created through peatland restoration measures.

The range reported in 2013-2018 was 18,700 km². The increase of eight 10x10 km grid cells is the result of the inclusion of 3160 pools created by restoration measures on raised bog (see section 2.5 above). Although this can be considered to be a genuine increase in range, it is likely to be only temporary and these pools are, in general, expected to succeed to active raised bog ecotopes over time. Continued and future restoration measures for active raised and blanket bog are likely to result in the creation of additional 3160 pools.

Owing to restoration measures and natural succession, the 3160 range is expected to continue to expand and contract over time. Until the vegetation communities stabilise on restored active raised and blanket bog, the estimated range when the Directive came into force (see NPWS, 2013, 2019; O Connor, 2015) will continue to be used at the Favourable Reference Range. The Favourable Reference Range is widely distributed, includes all significant Irish ecological variations of the habitat, and its area is large at approximately 21% of the</td></tr>
</table>

	(87,700 km^2) terrestrial grid and sufficient to support the long-term viability of the habitat.

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	***26.7 km^2***
	b) Maximum	***37.4 km^2***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable /* ***increasing*** */ decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***

5.9 Short-term trend **Magnitude** **Type of estimate**		
5.10 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*		
5.12 Long-term trend **Direction** *Optional*		
5.13 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend **Method used** *Optional*		
5.15 Favourable reference area	***a) 26.7 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ ***Other*** *(Elaborate in Additional information 5.17)*	

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The distribution was used to estimate habitat area, following the approach employed for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. It became clear during mapping of 3160 for the 2007-2012 report and the site-specific conservation objectives that many dystrophic lakes and pools, within areas of blanket bog in particular, were not mapped at either 1:50,000 or 1:5,000 scales. Therefore, the surface areas provided are considered likely to underestimate the area of the habitat in Ireland. The minimum estimate summed the surface areas of all 13,036 lake segments that were classified as containing the habitat (26.7 km^2). This area can be assumed to encompass the total area of new 3160 pools created through restoration measures at the six raised bogs (Cloncrow, Ardagullion, Killyconny, Girley, Scohaboy and Abbeyleix Bogs, see also Section 2.5). It is likely that the total area of new 3160 habitat is less than 2,000 m^2 (0.002 km^2) per bog, or a total of 0.012 km^2. The maximum estimate included a correction factor for unclassified lake segments, following the 2007-2012 and 2013-2018 methods (NPWS, 2013, 2019; O Connor, 2015). The total area of 3160 lakes less than 1 ha in area is 10.1 km^2. This represents 93% of the total area of classified segments less than 1 ha (10.8 km^2). It is assumed, therefore, that 93% (10.7 km^2) of the area (11.45 km^2) of the remaining 4,380 unclassified segments less than 1 ha in area is habitat 3160. 26.7 km^2 and 10.7 km^2 were summed to give the maximum area of 37.4 km^2. While the distribution (section 2.5) and range (section 4.14) increased owing to the creation of 3160 pools through restoration measures on raised bog, the area of the habitat did not increase significantly and any changes between reporting periods result from changes in map-base. In line with the 2013-2018 report (NPWS, 2013, 2019; O Connor, 2015), it is assumed that the current area includes all significant Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat, and the estimated minimum surface area is set as the Favourable Reference Area. The habitat is widespread and found in a large number of individual lakes and pools. Continued and future restoration measures for active raised and blanket bog are likely to result in the creation of additional 3160 pools, however natural succession is expected to result in many of those pools becoming terrestrial peatland communities over time, particularly on raised bog.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.63 km²***
		Maximum	***0.63 km²***
	b) Area in not-good condition	**Minimum**	***0.92 km²***
		Maximum	***0.92 km²***
	c) Area where condition is not known	**Minimum**	***25.15 km²***
		Maximum	***35.85 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013 - 2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO*		
6.7 Typical species Method used *Optional*	The list of typical 3160 species is based on that reported for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015). O Connor (2015) provides details of how the list was derived. The typical species include plant species, chydorid cladoceran species and aquatic macroinvertebrate species. The typical plant species were: *Sphagnum cuspidatum, Sphagnum auriculatum* (=*denticulatum*), *Juncus bulbosus, Potamogeton polygonifolius, Cladium mariscus, Eleogiton fluitans, Menyanthes trifoliata, Myriophyllum alterniflorum, Nitella flexilis, Nitella translucens, Nymphaea alba, Sparganium angustifolium, Utricularia intermedia, Utricularia minor* (NPWS, 2013, 2019; O Connor, 2015). The typical chydorid cladoceran species were: *Alona affinis, Alona costata, Alona rustica, Alonella excise, Alonella nana, Alonopsis elongata, Camptocercus rectirostris, Chydorus sphaericus, Eurycercus lamellatus* and *Pleuroxus truncates* (NPWS, 2013, 2019; O Connor, 2015).		

	The typical aquatic macroinvertebrate species were: *Acilius sulcatus, Aeshna juncea, Agabus arcticus, Cordulia aenea, Dytiscus lapponicus, Gyrinus minutus, Gyrinus substriatus, Helophorus flavipes, Hydroporus gyllenhalii, Hydroporus obscurus, Hydroporus pubescens, Hydroporus tristis, Ilybius aenescens, Leptophlebia vespertina, Pyrrhosoma nymphula, Sigara scotti* (NPWS, 2013, 2019; O Connor, 2015). The list was reviewed based on the findings of the PeAT lakes project (Cappelli, 2024; Cappelli *et al*., 2023; Gray, 2022; Lally *et al*., 2025), and the following Coleopteran additions were made *Boreonectes multilineatus Gyrinus aeratus*, *Haliplus fulvus*. Despite their abundance in the PeAT lakes, generalist odonate species (such as *Enallagma cyathigerum, Ischnura elegans* and *Sympetrum striolatum*) were not added to the typical species list owing to their widespread distribution and occupancy of a wide variety of habitats.
6.8 Additional information *Optional*	Habitat 3160 is a naturally dystrophic, botanically species-poor habitat found in peatland areas, commonly as a complex mosaic with active blanket bog, wet heath and other habitats. By definition, the habitat requires low nutrient, dystrophic conditions. The PeAT lakes project (Cappelli, 2024; Cappelli *et al*., 2023; Gray, 2022; Lally *et al*., 2025), investigated 24 lakes and pools in three discrete areas of relatively intact blanket bog in Counties Galway and Mayo. It found distinct regional differences among the sites in terms of water chemistry and biological communities, and concluded that all 24 were dystrophic and in favourable conservation condition. The ecological functioning of the 24 waterbodies was driven by dissolved organic matter and mixotrophic algae rather than macrophytes, whose communities were relatively sparse and species poor, and showed no distinct vegetation zonation patterns (Lally *et al*., 2025). Desmids were the most species-rich planktonic and benthic groups (332 desmid species recorded), and the habitat is an important refuge for rare and vulnerable desmid species (Lally *et al*., 2025). The project significantly improved understanding of the ecological characteristics of the habitat. Despite this, the sample size is small (24 out of 13,036 mapped 3160 lakes and pools) and skewed towards peatland in good condition. The academic team at Atlantic Technical University has continued to gather physico-chemical data for 3160 lakes and pools. Evidence of water chemistry impacts has emerged from a recent analysis of data for 94 lakes and pools, and distinct regional variation is also still evident (Heather Lally, pers. comm.). Water chemistry data from 40 lakes and pools in the Nephin Forest (Heather Lally, pers. comm.) indicate negative impacts as a result of forestry land use. The 2007-2012 and 2013-2018 assessments were informed by research demonstrating significant impacts in blanket bog lakes from conifer plantation forestry (HYDROFOR Project: Drinan, 2012; Drinan *et al.*, 2013; Kelly-Quinn *et al*., 2016). The loss of high conservation value odonate and coleopteran species from impacted lakes was of particular concern. The changes in hydrochemistry, chydorid and macroinvertebrate assemblages documented were the result of enrichment, rather than acidification, processes. The project studied 26 lakes and found the 13 study lakes within catchments of mature,

	closed-canopy conifer forest and recently clear-felled areas were impacted – a total area of 29.2 ha (0.292 km^2). A 2013 review of other research into the impacts of forest operations, particularly clearfelling, on water quality demonstrated that significant increases in nutrient, sediment and DOC are common across forests on peatland, particularly during and after clear felling (NPWS, 2013; O Connor, 2015). The reported area in good condition (0.6283 km^2) is the summed area of the 24 lakes and pools (0.4453 km^2) studied by the PeAT projects, and the 13 lakes (0.183 km^2) in relatively intact blanket bog catchments studied by the HYDROFOR project, and is considered to be a significant underestimate of the total national area in good condition. The reported area in not-good condition (0.923 km^2) is the summed area of 13 lakes (0.292 km^2) in forested catchments studied by the HYDROFOR project and all 3160 lakes and pools (0.631 km^2) within the Nephin Forest, and is considered to be a significant underestimate of the total national area in not-good condition. The reported area where condition is not known is the remainder of the reported minimum area (5.2a) and maximum area (5.2b). Owing to the aims and site selection in the PeAT lakes and HYDROFOR projects, the proportional areas in good and not-good condition cannot be used to estimate regional or national Structure and functions. In consequence, there is currently no reliable means of estimating the area in good and not-good condition. Based on the evidence of the HYDROFOR project (Drinan, 2012; Drinan *et al.*, 2013; Kelly-Quinn *et al*., 2016) and others, however, and the continued significant pressures on peatland in the catchments of dystrophic lakes and pools in Ireland, notably forestry, peat extraction, and agricultural uses including drainage and over-grazing, it must be assumed that a significant proportion of the 3160 habitat area in Ireland is in not-good condition. The occurrence of 3160 lakes and pools within and adjacent to conifer forests was investigated to estimate the maximum area in not-good condition. Spatial data for forests were intersected with the distribution data (13,036 lakes and pools mapped as 3160). A total of 1,397 lakes and pools with an area of 6.24 km^2 intersected Coillte properties. A total, when duplicates were removed, of 179 lakes and pools with an area of 1.56 km^2 intersected with private forests. Summing the figures therefore, 1,576 3160 lakes and pools with an area of 7.8 km^2 intersect conifer forests and are considered likely to be in not-good condition. While some Coillte properties are not planted with trees, 7.8 km^2 (or 21% of the reported maximum area in 5.2b) is considered representative of the habitat area impacted by conifer forests as the analysis did not take full catchment areas into account. In addition to impacts from conifer plantations, other pressures on surrounding peatlands, such as over-grazing, burning and drainage, are likely to be impacting on habitat 3160. Blanket bogs (7130) and wet heath (4010) were assessed as having *Unfavourable-Bad* Structure and functions for the reporting cycle. Monitoring data for

	blanket bog (7130) from the current reporting period showed a failure rate at monitoring stops of 58.2%. As the dataset was limited, data from the previous reporting period were also used, when the failure rate was 47.9% in not-good condition. It is assumed that 3160 pool systems tend to be found in peatland areas in good condition and are less likely to be impacted by over-grazing and burning, however larger 3160 pools and lakes may be found in peatland in not-good condition. A total of 420 of the 3160 lakes and pools are >1 ha in area and have a total area of 16.65 km^2. Applying the percentages (58.2% and 47.9%) of blanket bog in not-good condition to the area of 3160 lakes >1 ha gives 9.7 km^2 and 7.98 km^2. This represents 26% and 21%, respectively, of the maximum reported area. Based on interpretation of limited available data, therefore, 21-26% of the habitat may be in not-good condition. Given the evidence from the 24 PeAT lake sites and the association of the habitat with relatively intact and well-functioning blanket bog, however, expert opinion is that <25% of the habitat is in not-good condition overall. The overall *Unfavourable-Inadequate* Structure and functions assessment is conservative and in keeping with the Conservation Status reported for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019). In the absence of repeat monitoring data on the condition of the habitat, the short-term trend in Structures and functions is, in line with the trend assessment for blanket bog (7130), based on expert opinion and assumed to be *stable*. The PeAT lakes project made recommendations for research and monitoring of habitats 3110 and 3160 (Lally *et al*., 2025). Further work is needed to implement a representative monitoring programme for habitat 3160, using practical, standardised methods.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PB23 Physical alteration of water bodies for forestry (including dams)	Ongoing and likely to be in the future	Minority <50%	High
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium

PA20 Livestock farming generating pollution	Ongoing and likely to be in the future	Minority <50%	Medium
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Medium
PC08 Extraction activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Low
PJ03 Changes in precipitation regimes due to climate change	Only in the future		
PJ09 Landslides, subsidence and solifluction due to climate change	Only in the future		

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Pressures and threats reported for the 2007-2012 and 2013-2018 cycles were updated to the new codes and included again for this cycle. NPWS (2013) detailed how these were identified through examination of available pressure data from research projects, as well as WFD and forestry data. See also O Connor (2015). Reference was also made to the Pressures and Threats reported for blanket bog (7130) and wet heath (4010) for this cycle. Drainage, for agriculture, forestry, turf-cutting and other purposes, can result in the destruction of dystrophic pools, as well as indirect hydrological impacts in both lakes and pools. The aeration and mineralisation of peat resulting from drainage increases losses of ammonia and dissolved and particulate organic fractions. These pollutants, in turn, cause increased colour and turbidity, increased sedimentation and enrichment of dystrophic lakes and pools. Enrichment in these instances is typically through increased biomass of heterotrophic and mixotrophic organisms that can utilise organic matter. The loss of organic acids from drained and degraded peatland

	has also been demonstrated to result in acid episodes in Irish streams, however, there is less evidence for acidification of lakes and pools. Conifer forest on peatland results in high pollutant loads. Direct loss of dissolved nutrients can occur during fertilisation. Significant losses of both organic matter and nutrients occur following tree-felling, through slow decomposition of conifer needles, branches and roots (EPA Catchment Science & Management Unit, 2024; Drinan, 2012; Drinan *et al*., 2013; Flynn, *et al*., 2022; Kelly-Quinn *et al.*, 2016). Pollution with dissolved and particulate organic matter, as well as fine sediment, can also arise from agriculture through over-grazing of peatland, as well as burning. Pollution also results from drainage and disturbance of peatland for turf-cutting and wind farm development. Significant work is underway to develop and implement conservation measures to protect and restore peatland in Ireland. Raised bog restoration work has already resulted in the creation of new 3160 pools. The development, prioritisation and implementation of effective restoration measures for blanket bog is on-going, but will take time. Furthermore, it will take time for those blanket bog restoration measures to take effect and it is uncertain whether 3160 lakes and pools that have been significantly impacted will recover. As a result, all pressures are listed as ongoing and likely to be in the future. It is expected, however, that most of the listed pressures will reduce over time, owing to conservation efforts. Climate change impacts are listed as threats, but it is possible that these are already manifested pressures, particularly as they can exacerbate all of the existing pressures. Changing precipitation patterns are a particular concern, with increases expected in dry or drought periods and intensive rainfall and storm events. As well as potentially reducing the number of overall rainfall days, a factor seen as important in the creation and maintenance of bog habitats, these changes are likely to result in increased mineralisation of peat and increased risks of peat erosion and land-slides. See also Dykes (2008, 2022) and Renou-Wilson & Wilson (2018). Acid episodes related to rainfall events are also likely to increase in Irish rivers. It is possible that Ireland's changed climate will not be able to support peatland habitats across all of their historic distribution. However, as 3160 pools and lakes are typically associated with flat areas frequently in basins and/or low-lying regions, they may be more resilient to climate change than other peat habitats. Based on the Structure and functions assessments (see section 6.8) all pressures are listed as affecting the minority <50% of the habitat area. See IE conservation assessments for blanket bogs (7130) and wet heath (4010) for the 2019-2024 cycle for further information on pressures impacting these peatlands.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) MC02 Adapt/manage exploitation of energy resources MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure
8.7 Additional information *Optional*	The conservation measures required to maintain or restore the habitat include: – Restoration of active blanket and raised bogs – reversal of drainage impacts/ restoration of hydrological regime, and – reducing pollution (with dissolved and/or particulate nutrients, humic substances, organic matter and fine sediment/turbidity) from agricultural, forestry, turf-cutting, and other sources. Option (b) 'Part of measures identified have been taken' was chosen, because some of the identified raised and blanket bog restoration measures have been taken, however the majority, particularly for blanket bog have yet to be implemented, and specific conservation measures have not been developed to restore the Structure and functions of habitat 3160. IE conservation assessments for blanket bogs (7130) and wet heath (4010) for 2019-2024 cycle, and other sources, were used to select the list of main conservation measures. Drain blocking and restoration of the hydrological regime are essential aspects of blanket bog restoration that can benefit habitat 3160. Not all measures taken for blanket bog, however, will benefit habitat 3160, as some areas of blanket bog, notably those in upland areas or on steeper slopes, do not naturally contain pool systems and are not in lake catchments. On-going work by NPWS to develop restoration action plans and good-practice restoration methods for blanket bog, as well as to strategically prioritise the implementation of peatland restoration measures is expected to improve the conservation status of habitat 3160 over the next reporting cycle. The INTERREG VA project Cooperation Across Borders for Biodiversity (CABB) blocked a network of drains at Fiddandarry Bog within Ox Mountains Bog SAC (002006) in an important area for 3160 pool systems. Fencing and a sustainable grazing management plan were instigated on state-owned land at Dunragh Loughs/Pettigo Plateau SAC (001125). The measures implemented by INTERREG VA project Collaborative Action for the Natura Network (CANN) included drain

	blocking in Cuilcagh-Anierin Uplands SAC (000584) and Sliabh Beagh/Eshbrack Bog NHA NPWS is implementing blanket bog restoration measures in National Parks, including at Liffey Head, however these have not yet been shown to benefit habitat 3160, which is notably, naturally less frequent in blanket bogs in the east of Ireland than in the west. LIFE IP Wild Atlantic Nature (WAN) is operating within 35 blanket bog SACs with a total area of 262,632 ha. Agricultural measures were piloted through a Results-based Payment Scheme in 2021/2022 that informed the development of Agri-Climate Rural Environment Scheme ACRES Co-operation (ACRES CP). Locally led European Innovation Partnerships (EIPs) have also operated in peatland areas. Demonstrating whether these schemes have benefited habitat 3160 requires analyses of the geographic spread and type of measures implemented, as well as information on hydrological and ecological responses. Effective measures to block drains, and reduce over-grazing and burning could benefit the habitat, however actions such as invasive species control could have neutral or negative impacts on freshwaters. Coillte Nature has ambitious plans for the removal of conifer plantations from blanket bogs through the Wild Western Peatlands project. NPWS has similar plans for the Nephin forest (Wild Nephin Conversion). Removal of conifer plantations and restoration of open blanket bog has potential to restore 3160 area and structure and functions, however it is challenging to do. Tree removal from peatland is likely to result in water pollution and may also have hydrological impacts, so careful planning is essential to minimise and spread these risks. See the conservation assessments for raised bogs (7110) blanket bogs (7130), and wet heath (4010) for 2019-2024 cycle for detailed information on conservation measures for these peatland habitats. A key consideration for larger 3160 lakes and pool systems with defined catchments is that measures may be required across the entire catchment area to restore the habitat. Restoring open peatland, heath and grassland vegetation is preferable for 3160 catchments, and proposals for woodland creation need careful consideration in relation to their resilience (to storms) and their potential hydrological impacts (higher evapotranspiration leading to greater water table fluctuations). The Water Framework Directive (WFD) is charged with development and implementation of catchment measures for water through its Programmes of Measures and River Basin Management Plan. WFD implementation in Ireland, however, does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (DHLGH, 2024). It contains, as an action (3.8): "The water-related requirements of water-dependant habitats and species will be reviewed by the Water Division, the National Parks and Wildlife Service and the EPA during the third RBMP cycle, taking account of the most recent

	scientific evidence. If necessary, proposals for updating the related water standards will be made and this will be integrated into the catchment management process." Site-specific conservation objectives for lake habitat 3160 in the ten SACs designated for its protection were published between 2015 and October 2017. Fifty-five of the 13,036 3160 lakes and pools are mapped and assessed lake waterbodies for the WFD third cycle (2022-2027, see https://gis.epa.ie/EPAMaps/Water). Only one of the 55, Lough Enask in the Roundstone Bog Complex, was assigned a WFD high status objective, with the remaining 54 having the objective of good status. Seven of the 55 are monitored under the WFD. Two of the seven were assessed as in high ecological status under WFD, four were in good status and one, Lough Tay, in moderate status. Given the dystrophic nature of the habitat, and the importance of organic matter to its ecological structure and functions, WFD monitoring, status assessment methods and ecological quality standards are currently not suitable for setting objectives or managing conservation measures for habitat 3160. Inclusion of the ecological requirements of 3160 within WFD waterbody objectives is needed in order to protect and restore the habitat.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The Future prospects of the Range, Area and Structure and functions of habitat 3160 were assessed by reference to the current status, reported pressures and threats, conservation measures and expected future trends: *Pressures and conservation measures*: Habitat 3160 is subject to continued significant pressures, notably forestry, peat extraction, and agricultural uses including drainage and over-grazing. A large body of work is underway, however, to develop and implement conservation measures to protect and restore peatland in Ireland. Raised bog restoration work has already resulted in the creation of new 3160 pools. The development, prioritisation and implementation of effective restoration measures for blanket bog is on-going, and will take time. Furthermore, it will take time for those blanket bog restoration measures to take effect. As a result, all pressures are listed as ongoing and likely to be in the future. It is expected, however, that most of the listed pressures will reduce over time, owing to conservation efforts. *Range*: The current range is larger than the Favourable Reference Range (FRR). The FRR is considered to include all significant Irish ecological variations of the habitat and to be sufficiently large to allow the long-term viability of the habitat. The short-term trend of Range is *increasing*. The 3160 range is expected to continue to expand and contract over time, in response to raised and blanket bog restoration	

	measures and natural succession in bog vegetation. The overall future trend in Range is expected to be *stable*, or a slight increase. Therefore, the Future prospects of Range are assessed as *Good*. *Area*: The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. The short-term trend of Area is *increasing*. The 3160 area is expected to continue to expand and contract over time, in response to raised and blanket bog restoration measures and natural succession in bog vegetation. The overall future trend is *positive*, with a slight increase in area expected. Therefore, the Future prospects of Area are assessed as *Good*. *Structure and functions*: Condition data are limited for 3160 lakes and pools and skewed towards lakes in good condition and those impacted by forestry. Based on the available data, as well as data on the conservation condition of blanket bog (7130) in Ireland and the distribution of pressures such as forestry, Structure and functions are assessed as *Unfavourable-Inadequate*. It is anticipated that conservation measures will lead to future improvements in the condition of habitat 3160 and an overall *positive* future trend in Structure and functions of 3160. Owing to the time it will take to implement the necessary measures and the uncertainty as to whether the structure and functions of 3160 lakes and pools that have been significantly impacted will fully recover, it is assumed the Structure and functions will remain, overall, *Unfavourable-Inadequate* for at least the next 12 years. As a result, Future prospects of Structure and functions are assessed as *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* ***improving*** */ deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*

	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	***c) yes, due to improved knowledge/more accurate data***
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	*Range:* The current range is larger than the Favourable Reference Range. The Favourable Reference Range is considered to include all significant Irish ecological variations of the habitat and be sufficiently widespread and large, at approximately 21% of the terrestrial grid, to allow the long-term viability of the habitat. The short-term trend of Range is *increasing*. As a result, the conservation status of Range is assessed as *Favourable*. The 3160 range is expected to continue to expand and contract over time, in response to raised and blanket bog restoration measures and natural succession in bog vegetation. The overall future trend in Range is expected to be *stable*, or a slight increase, and its Future prospects are *Good*. *Area:* The estimated minimum surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. The short-term trend of Area is *increasing*. As a result, the conservation status of Area is assessed as *Favourable*. The 3160 area is expected to continue to expand and contract over time, in response to raised and blanket bog restoration measures and natural succession in bog vegetation. The overall future trend in Area is *positive*, with a slight increase in area expected, and its Future prospects are assessed as *Good*. *Structure and functions:* Condition data are limited for 3160 lakes and pools and skewed towards lakes in good condition. There are also data for a small number of 3160 lakes impacted by forestry that show the resultant changes in structure and functions are significant and long-lived. The area of the habitat estimated to be impacted by forestry (7.8 km^2) is up to 21% of the maximum estimated area. In addition to forestry, other pressures on surrounding peatlands, such as over-grazing, burning and drainage, are likely to be impacting on habitat 3160. Blanket bogs (7130) and wet heath (4010) were assessed as in *Unfavourable-Bad* and *deteriorating* for the reporting cycle. Given that 3160 pools are mostly associated with large, flat expanses of blanket bog in relatively good condition, however, and that 56% (or 20.8 km^2) of the reported maximum habitat area (5.2b) is comprised of pools and small lakes <1 ha in area, it is assumed that less than 25% of the overall	

	habitat area is unfavourable (in not-good condition) and, therefore, Structure and functions are assessed as *Unfavourable-Inadequate*. *Future prospects:* The Future prospects of Range and Area are assessed as *Good*, and their predicted future trends are *positive*, in response to conservation measures. The Future prospects of Structure and functions is assessed as *Poor*. It is anticipated that conservation measures will also lead to future improvements in the condition of habitat 3160 and an overall *positive* future trend in the Structure and functions of 3160. However, owing to the time it will take to implement the necessary measures and the uncertainty as to whether those measures will be effective, it is assumed the Structure and functions will remain, overall, *Unfavourable-Inadequate* for at least the next 12 years. As the Future Prospects of one parameter (Structure and functions) are *Poor*, the overall Future prospects are assessed as *Unfavourable-Inadequate*. *Overall conservation status:* As Structure and functions and Future prospects are assessed as *Unfavourable-Inadequate*, the Overall Conservation Status of 3160 is assessed as *Unfavourable-Inadequate*. Trends for Range and Area are assessed as *improving*, as a result of conservation measures on raised and blanket bog. The trend for Structure and functions is assessed as *stable*. In accordance with the explanatory notes, the overall trend is reported as *improving*. Future improvements in the habitat are dependent on the implementation of effective hydrological restoration measures, particularly for blanket bog. Further work is needed to implement a representative monitoring programme for the habitat, using practical, standardised methods.

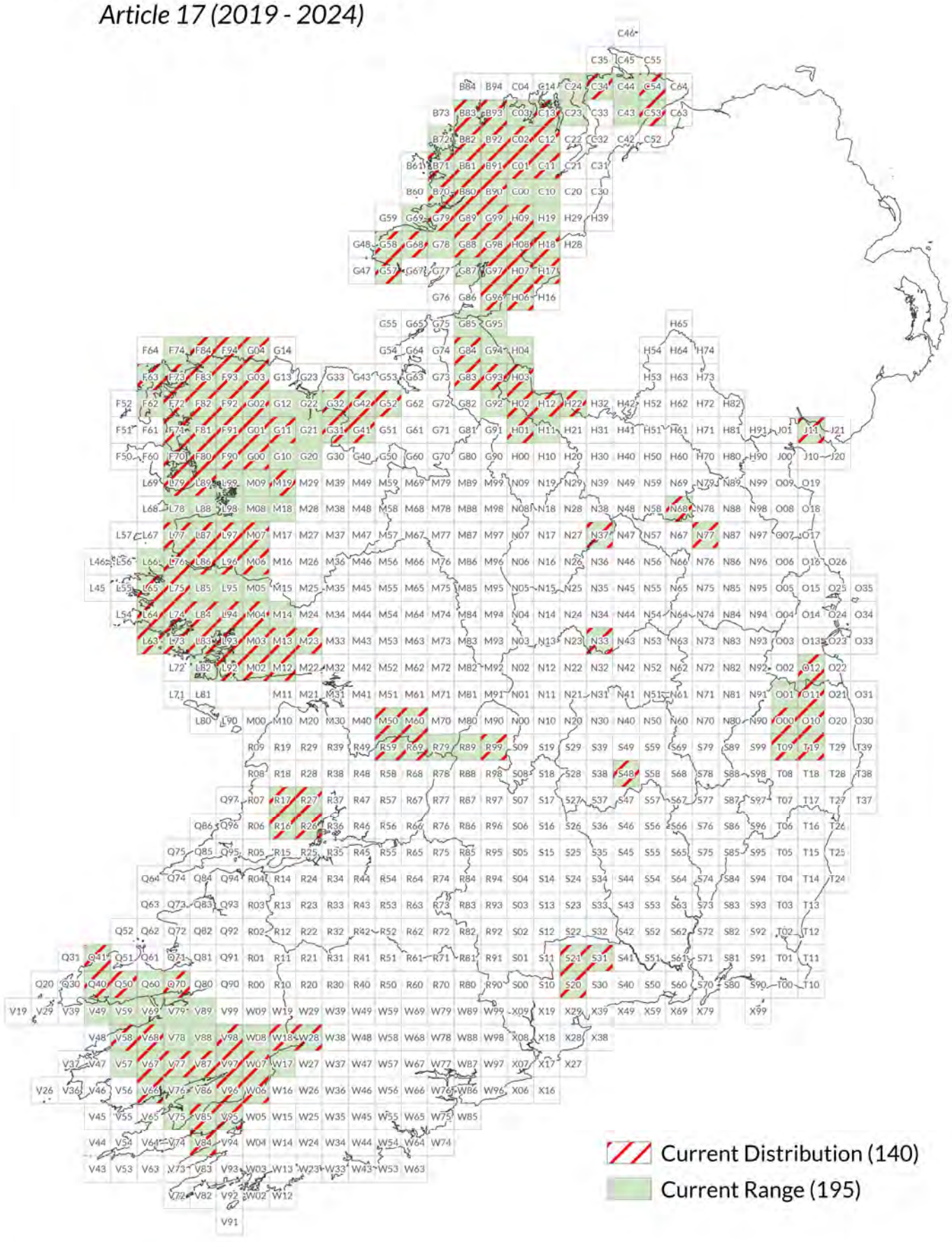
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***16.4 km²***
	b) Maximum	***19.65 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable /* ***increasing*** */ decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) **stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	The distribution was used to estimate the surface area of the habitat type inside the pSCIs, SCIs and SACs network, following the approach employed for the 2007-2012 and 2013-2018 cycles (NPWS, 2013, 2019; O Connor, 2015). Estimates used the surface area of the lake polygons classified as containing the habitat. The minimum estimate (1,638.83 ha = 16.4 km^2) summed the surface areas of the lake segments that were classified as containing the habitat and were within SACs designated for the protection of the habitat. The maximum estimate (1,965.35 ha = 19.65 km^2) summed the surface areas of all lake segments that were classified as containing the habitat and were wholly within any SAC. As explained in section 5.17, many dystrophic lakes and pools within areas of blanket bog are not mapped and, therefore, both figures given are likely to underestimate the area of the habitat. The 24 lakes studied by PeAT lakes project are in SACs (Cappelli, 2024; Cappelli *et al*., 2023; Gray, 2022; Lally *et al*., 2025). All 24 were within relatively intact blanket bog, dystrophic, and in favourable conservation condition. The sample size is small and skewed towards peatland in good condition. In the absence of repeat monitoring data on the condition of the habitat, the short-term trend in Structures and function is, in line with the trend assessment for blanket bog (7130), based on expert opinion and assumed to be *stable*.

12 Complementary information *N/A*

Acid oligotrophic lakes (3160)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**3180 Turloughs***
1.2i Habitat short name	**Turloughs**
1.3i Habitat description	A turlough is a limestone basin that floods annually. The inflow may come from a stream or river or from the groundwater but is without overground outflow. Turloughs are usually temporarily flooded in winter and dry during summer, though this varies greatly with rainfall and groundwater dynamics. The water lies until a fall in the ground water table allows release of water through the porous karstified bedrock and through evaporation. Turloughs are entirely restricted to geological regions of well-bedded, relatively pure karstified Carboniferous limestone. Turloughs can be described as the floodplains of underground rivers and show a distinctive zonation of plants relating to the duration of flooding. They typically contain wetland vegetation communities in their lower zones such as lakes, fens, and wet grassland, and drier vegetation communities more characteristic limestone soils in their upper zones such as grasslands, scrub and woodlands. Turlough communities can include other Annex I habitats, notably hard water lakes (3140), alkaline fens (7230), Chenopodion vegetation (3270) and limestone pavement (8240). Some larger turloughs are important for large numbers of bird species, offering winter feeding grounds and occasionally breeding grounds, for several species of waterfowl and wading birds. A few turloughs area designated as Special Protection Areas under the Birds Directive. Turloughs also contain numerous specialist invertebrates; most turloughs have permanent wet areas and ponds that are important to aquatic invertebrates, such as the characteristic moss-edge water beetles, during the dry phase. Bare ground is important to invertebrate groups such as ground beetles, as well as Chenopodion vegetation (3270). Marginal woodland and scrub, as well as fringing limestone pavement and semi-natural grasslands, are also important for terrestrial invertebrates. Grazing is an integral function to the ecology of turlough habitats and it is important that appropriate grazing levels are maintained. The climax vegetation for the drier parts of turloughs is wet woodland, but owing to grazing practices, turlough woodland is now quite rare. Hydrology is the key driver of turlough ecology, with flood duration and groundwater contribution important factors. The main pressures are drainage, water pollution, and ecologically unsuitable grazing, and at a wider landscape scale, flood relief schemes. Additionally, a recent study indicates early signs of climate change pressures in turloughs reflected in changes in hydrological regimes.

	Remote sensing and field survey by the Geological Survey Ireland has improved knowledge of the distribution of the habitat and indicates Ireland may have in excess of 900 turloughs.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2005-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* **a) Complete survey or a statistically robust estimate** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution of turloughs in Ireland is based on the 2013-2018 Article 17 distribution, which was a combined polygon and point shapefile with 451 turloughs. The Geological Survey Ireland (GSI) provided a turlough dataset with 834 polygons, created using remote sensing with geological field verification of a sub-set of sites. A full comparison of the datasets was not possible in the time available, so efforts concentrated on GSI sites that fall outside of the distribution mapped for the 2013-2018 reporting cycle. The GSI data were also examined for some important and high-density areas of turloughs. In total, 23 new turlough polygons were added from the GSI data, and three GSI improved turlough polygons were used to replace existing points or polygons. One further turlough, Rockforest, was added to the distribution based on NPWS knowledge. Following revision, the 2019-2024 distribution is based on 474 turlough points and polygons. A 10x10 km grid cell distribution was generated based on the point and polygon data, occupying a total of 123 10x10 km cells. The distribution reported for the 2013-2018 cycle covered 109 10x10 km grid cells, so an additional fourteen 10x10 km cells were added. The GSI data have improved the knowledge of the distribution of the habitat and indicates Ireland may have in excess of 900 turloughs / karstic flooding sites. However, further work is required to assess the quality of these sites as turlough habitats.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic,*** *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Allott, N., Coxon, C. & Cunha Pereira, H. (2015) Water chemistry and algal biomass. Chapter 4 in: Waldren, S. (ed.) Turlough hydrology, ecology and conservation. Unpublished report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. pp 145-170. Bhatnagar, S., Gill, L., Waldren, S., Sharkey, N., Naughton, O., Johnston, P., Coxon, C., Morrissey, P. & Ghosh, B. (2021) Ecohydrological metrics for vegetation communities in turloughs (ephemeral karstic wetlands). *Ecohydrology*, 14. https://doi.org/10.1002/eco.2316. Conaghan, J. (2024) A survey of the vegetation of the habitat "Rivers with muddy banks with Chenopodium rubri p.p. and Bidention p.p. vegetation" (3270), in selected sites in counties Galway, Clare and Roscommon. Unpublished report to the National Parks and Wildlife Service, DHLGH, Dublin. https://www.npws.ie/sites/default/files/publications/pdf/Chenopodion-habitat-survey-2024.pdf. Conaghan, J. & Fuller, J. (2018) A survey of the vegetation of the Habitats Directive Annex I habitat Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation (3270), in Ireland (2018). Unpublished Report to the National Parks and Wildlife Service, DCHG, Dublin. https://www.researchgate.net/publication/351924275_Ecohydrological_metrics_for_vegetation_communities_in_turloughs_ephemeral_karstic_wetlands. Conaghan, J., Roden, C. & Fuller, J. (2006) A Survey of Rare and Scarce Vascular Plants in County Galway. Vols 1-3. Unpublished report to National Parks and Wildlife Service, Dublin. Coxon, C. (1986) A study of the geology, hydrology and geomorphology of turloughs. Unpublished Ph.D. thesis, University of Dublin, Trinity College, Ireland. Coxon, C.E. (1987a) The spatial distribution of turloughs. *Irish Geography,* 20, 11-23. Coxon, C.E. (1987b) An examination of the characteristics of turloughs using multivariate statistical techniques. *Irish Geography,* 20, 24-42. Ellis, D.J. (2024) Vegetation community classification to infer protected habitat extent in a turlough Special Area of Conservation in the West of Ireland. *Irish Naturalists' Journal*, 41, 28.

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	NPWS (2021b) Conservation Objectives: Castletaylor Complex SAC 000242. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000242.pdf NPWS (2021c) Conservation Objectives: Bricklieve Mountains and Keishcorran SAC 001656. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001656.pdf NPWS (2021d) Conservation Objectives: Peterswell Turlough SAC 000318. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000318.pdf NPWS (2021e) Conservation Objectives: Clyard Kettle-holes SAC 000480. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000480.pdf NPWS (2021f) Conservation Objectives: Castlesampson Esker SAC 001625. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001625.pdf NPWS (2021g) Conservation Objectives: Lough Coy SAC 002117. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002117.pdf NPWS (2021h) Conservation Objectives: Carrowbaun, Newhall and Ballylee Turloughs SAC 002293. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002293.pdf NPWS (2021i) Conservation Objectives: Cahermore Turlough SAC 002294. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002294.pdf NPWS (2021j) Conservation Objectives: Ballinduff Turlough SAC 002295. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002295.pdf NPWS (2021k) Conservation Objectives: Dunmuckrum Turloughs SAC 002303. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002303.pdf

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NPWS (2020a) Conservation Objectives: Levally Lough SAC 000295. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000295.pdf

NPWS (2020b) Conservation Objectives: Rahasane Turlough SAC 000322. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000322.pdf

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***18,200 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*
4.3 Short-term trend Period	***2013-2024***

4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 18,200 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: **high**/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 182 10x10 km cells. Twenty grid cells were added to the range since the last reporting period (163 grid cells in 2013-2018). Changes can be attributed to improved knowledge and more accurate data, owing to data provided to NPWS from remote sensing and field survey by the Geological Survey Ireland, as well as NPWS internal data and information from Fitzgerald (2024), as explained in section 2.5. Trend is assessed as *stable* as there is no evidence of loss of turloughs since the Directive came into force.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2005-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	***56.8 km²***
	b) Maximum	***64.9 km²***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*		
5.12 Long-term trend Direction *Optional*		
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

5.14 Long-term trend Method used *Optional*		
5.15 Favourable reference area	***a) 56.8 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The distribution was used to calculate the maximum area (see section 2.5). Turlough surface area was based on polygon data, where available, including for the new Geological Survey Ireland polygons (23 turloughs added). Area estimates were also available for 174 turlough points. Following the approach of NPWS (2013, 2019), an average figure of 7.0994 ha was applied to the remaining 226 turlough points, for which no area estimates were provided. The summed area for the 474 turloughs is 64.9 km^2, which is reported as the maximum surface area. The reported maximum may underestimate the total surface area, as the Geological Survey Ireland dataset contains 834 turlough polygons, of which *c*. 460 polygons need to be reviewed and validated. The reported maximum (64.9 km^2) is 1.5 km^2 larger than the 63.4 km^2 maximum reported for 2013-2018. The changes are the result of improved knowledge of the distribution of turloughs, particularly with the inclusion of GSI polygons (improved knowledge/more accurate data). The minimum surface area of the habitat reported for the 2013-2018 reporting period (56.8 km^2) is reported again as the minimum surface area for this period. It was calculated by removing the summed area (6.6 km^2) for 87 unconfirmed or 'potential' turloughs from the 2013 to	

	2018 estimated maximum (63.4 km^2) (NPWS, 2019). Therefore, the estimated minimum surface area is based on confirmed turloughs only. The Favourable Reference Area is the estimated minimum surface area of 56.8 km^2. This area is considered to be sufficient for the long-term survival of the habitat.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***10.9 km²***
		Maximum	***10.9 km²***
	b) Area in not-good condition	**Minimum**	***2.9 km²***
		Maximum	***2.9 km²***
	c) Area where condition is not known	**Minimum**	***43.0 km²***
		Maximum	***51.1 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES****/NO***		
6.7 Typical species Method used *Optional*	The typical species reported in NPWS (2013a) were revised by O Connor (2017) for the purposes of setting site-specific conservation objectives. This review reduced the typical species list to those that are indicative of good condition in turloughs (positive indicator species) and/or are known to be restricted to, or have most occurrences in, the habitat (characteristic species). The list was again updated based on the findings and recommendations of Conaghan & Fuller (2018), on the typical species of Chenopodion rubri p.p. and Bidention p.p. vegetation (3270) found in a subset of 3180 Turlough sites, when *Chenopodium rubrum* (*Oxybasis rubra*) and *Gnaphalium*		

	uliginosum were reinstated on the list. Conaghan (2024) re-surveyed six of these sites and no changes to typical species have been made for this reporting period. The full list of typical species for turloughs (3180) is given below. ***Typical turlough plant species:*** Regional Red List status (Wyse Jackson *et al*., 2016) is given, where relevant, as a superscript. Species indicated by * are considered turlough specialists, though not necessarily restricted to turloughs. † indicates typical species of habitat 3270. O'Connor (2017) also provides a list of other widespread plant species commonly found in turloughs, frequently at high abundance. *Alopecurus aequalis* ^{NT} † *Callitriche palustris*^{VU}*† *Carex viridula agg.* *Chenopodium rubrum (Oxybasis rubra)* † *Cinclidotus fontinaloides* *Drepanocladus sendtneri* ^{NT} *Eleocharis acicularis* † *Frangula alnus* (prostrate form*) *Galium boreale* *Gnaphalium uliginosum* † *Limosella aquatica*†* *Ophioglossum vulgatum* *Persicaria minor* † *Plantago maritima* *Potentilla fruticosa** ^{VU} *Drepanocladus lycopodioides* ^{VU} *Drepanocladus trifarium* ^{VU} *Ranunculus repens* (form with highly dissected leaves*) *Rhamnus cathartica* *Riccia cavernosa* † *Rorippa islandica*† *Schoenus nigricans* *Teucrium scordium** *Viola stagnina** ^{NT} ***Typical aquatic invertebrate species of turloughs:*** Those species indicated by * have a strong association with turloughs. Regional Red List status (Foster *et al*., 2009) is given, where relevant, as a superscript. *Agabus labiatus** ^{NT} *Agabus nebulosus* *Alona affinis*

	Alona rustica *Alonella excise* *Alonopsis elongata* *Bagous limosus* [CR] *Berosus signaticollis** [EN] *Diaptomus castor* *Dryops similaris** [NT] *Eurycercus glacialis** *Graptodytes bilineatus** [NT] *Haliplus obliquus* *Haliplus variegatus* [VU] *Helophorus minutus* *Helophorus nanus* [VU] *Hygrotus impressopunctatus* *Laccobius colon* *Laccobius minutus* *Lestes dryas** *Ochthebius minimus* *Polycelis nigra* *Rhantus frontalis* *Sympetrum sanguineum* ***Typical other invertebrate species of turloughs:*** Species indicated by * have a strong association with turloughs. *Agonum lugens** *Agonum muelleri* *Agonum piceum* *Bactra furfurana* *Badister meridionalis** *Badister peltatus** *Bembidion aeneum* *Bembidion clarkia* *Blethisa multipunctata* *Carabus granulatus* *Chlaenius nigricornis* *Chorthippus albomarginatus* *Colobaea distincta* *Deltote uncula* *Ilione albiceta* *Loricera pilicornis* *Monochroa lutulentella* *Paraponyx stratiotata* *Pelophila borealis*

	Pherbellia nana *Pherbina coryleti* *Philonthus furcifer* *Platynus livens** *Pterostichus nigrita* *Saldula opacula* *Tetrix subulata* *Thanatophilus dispar*
6.8 Additional information *Optional*	There is no dedicated turlough monitoring programme. Geological Survey Ireland monitors water levels of 20 turloughs https://gwlevel.ie/. The same data reported for 2019 were used, as no new condition surveys on turloughs have been completed in this reporting cycle. It is assumed there has been no change in structure and functions of turloughs in this reporting cycle and that the 2019 assessment for Structure and functions is representative. The 2019 report (NPWS, 2019) used assessments for 22 turloughs from Waldren *et al.* (2015) and for 98 turloughs from O'Neill & Martin (2015). 79% of the turlough area of 120 turloughs (having a total area of 13.8 km^2) was in good condition based on these estimations. There has been increased evidence of hydrological shifts in turloughs, primarily at Lough Funshinagh, Co. Roscommon, Caranavoodaun Turlough, Co. Galway, and potentially at Glenamaddy Turlough, Co. Galway. Naughton *et al.* (2021) found a substantial shift in the hydrological operation of Lough Funshinagh after a 2016 flood event, resulting in persistently high water levels. This shift is not explained by rainfall, and is likely to have resulted from anthropogenic activities (see also 5.17). The typical hydrological function at Lough Funshinagh has, therefore, been absent since 2016 or before, and the area where 3270 habitat occurs, reported in 2007 as 33 ha (Goodwillie, 2007), has not been exposed for at least the past 8 years. The true cause of this change in hydrological function is still uncertain, but both natural below-ground changes and land use pressure may have contributed. Caranavoodaun also has exhibited a change in hydrology, as it appears to only be fluctuating by 1-2 m, and not dropping below 22 m since sometime in the period 2011-2016, which has resulted in most of the turlough area remaining flooded throughout the year (GSI pers. comm., https://gwlevel.ie/). Glenamaddy Turlough, Co. Galway, also appears to have changed in hydrological function, reportedly remaining in flood condition longer into the summer in recent years, however it is understood the turlough does still drain and it is expected that 3270 habitat is still present when it does. The conservation condition of Glenamaddy was assessed as *uncertain* for the 2019-2024 reporting cycle. Ecological and hydrological monitoring of Glenamaddy is needed. Conaghan (2024) re-visited eight of the 3270 Chenopodion sites surveyed by Conaghan & Fuller (2018), and found that the structure

	and functions of the six surveyed sites largely remained the same, or was in fact slightly improved since 2018. The 3270 habitat is only found in a small number of turloughs and is a fraction of the overall turlough habitat, where it occurs in exposed mud. Therefore, the Structure and functions trend of 3270 cannot be taken as reflective of the overall Structure and functions of 3180 Turloughs. Structure and functions of the latter is therefore assessed as *Uncertain*. Ellis (2024) carried out vegetation mapping in the Clyard Kettle Holes SAC [00480], mapping 18.46 ha of turlough habitat in this SAC. The study did not focus on the condition of the habitats, however the overall impression of survey indicates 'good' condition in this SAC due to the variety of Annex I habitats and rare flora present.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Majority 50-90%	Medium
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Majority 50-90%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Low
PF14 Modification of flooding regimes, flood protection for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*

7.3 Sources of information *Optional*	O'Neill & Martin (2015) https://www.npws.ie/sites/default/files/publications/pdf/NTSV14_Turlough_report_Volume_I_and_Volume_II_01a.pdf. Conaghan (2024) https://www.npws.ie/sites/default/files/publications/pdf/Chenopodion-habitat-survey-2024.pdf. Uisce Éireann (2022) Annual Environmental Report 2022 Glenamaddy D0379-01 https://www.water.ie/sites/default/files/docs/aers/2022/D0379-01_2022_AER.pdf.
7.4 Additional information *Optional*	The main pressures on turloughs are drainage, water pollution, and ecologically unsuitable grazing levels. These pressures are unchanged since the 2013-2018 reporting period, as there have been limited studies or information conducted on turloughs since then. At a wider landscape scale, flood relief schemes may be a pressure, and are a threat, and a recent study indicates early signs of climate change pressures in turloughs reflected in changes in hydrological regimes. PA07 Intensive grazing or overgrazing by livestock: 13 of the 98 turloughs surveyed by O'Neill & Martin (2015) reported evidence of ecologically unsuitable grazing. Conaghan & Fuller (2018) recorded PA07 resulting in poaching (i.e. damage to integrity of the soil) in surveys for 3270 Chenopodion rubri habitats, was reported at four of the 18 sites and was severe in two of these sites which cover a small area within turlough sites. Conaghan (2024) noted this pressure was more moderate to absent in six sites visited in 2024, and overall lower than that observed in 2018. PA17 'Agricultural activities generating pollution to surface or ground waters (including marine)': 40 of the 98 turloughs surveyed by O'Neill & Martin (2015) reported evidence of nutrient enrichment. PA22 'Drainage for use as agricultural land': 27 of 98 turloughs surveyed by O'Neill & Martin (2015) reported evidence of drainage for agriculture. PF14 **'**Modification of flooding regimes, flood protection for built-up areas' and PL05 'Modification of hydrological flow (mixed or unknown drivers)' were used to cover on-going and proposed flood-relief schemes at Lough Funshinagh and South Galway, designed to protect rural housing, roads, other developments, infrastructure and agricultural land. These could negatively impact on the habitat. PL05 was also used to cover land drainage for agricultural and other land uses which can negatively impact the habitat by either decreasing the flood duration, or result in permanent flooding, leading to habitat loss. Similarly, PJ03 **'**Change in precipitation regimes due to climate change' is reported as both a pressure and a threat because hydrological analyses have shown changes in turlough flooding patterns linked to changing precipitation regimes (Morrissey *et al*., 2021) that could impact the habitat through shorter or longer flood durations. PB19 'Forestry activities generating pollution to surface or ground waters (including marine)' refers to occasional instances of forestry plantations found upstream of and next to turloughs in which

	pollution may run off into the groundwater system or in fact the turlough may be flooding into forestry. PF07 'Residential and commercial activities and structures generating pollution to surface or ground waters' refers to wastewater treatment plants at locations such as Glenamaddy and Lough Gash, but other examples may exist, and to one-off systems such as septic tanks, in which wastewater is entering the turloughs and groundwater systems (Uisce Éireann, 2022). PA25 'Agriculture activities not referred to above': This code is used to cover agricultural waste and dumping which occurs on some turloughs. It assumed to be low influence, however it has been theorised that if waste material enters swallowholes, it can cause blockages which would result in a medium or high influence. In addition, PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)' may be a pressure as nearby quarrying may impact groundwater and local aquifers that turloughs are connected to.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MF04 Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities
8.7 Additional information *Optional*	Measures are needed across the range of turloughs but every site will require specific site management to address various pressures. In particular, conservation measures should focus on the high impact pressures such as nutrient loading from the surrounding catchment, particularly arising from agricultural activities, ecologically unsuitable grazing, and drainage works. Some measures have taken place across a limited number of sites. Glenamaddy WWTP (located next to Glenamaddy Turlough SAC 0030) has been upgraded to Tertiary treatment system but it still discharging to the turlough. Any wastewater discharge to groundwater still has the potential to cause pollution to groundwater and the turlough. This has a higher impact to the turlough in summer when the levels are low. Waters of LIFE "The Islands" catchment in located in Galway/Roscommon and includes SAC turlough sites (Coolcam Turlough SAC 00218, Croaghill Turlough SAC 00255 and Williamstown Turloughs SAC 2296). The aim of this project is to improve water quality to 'Blue dot' status through incentives and payments to landowners. This may be beneficial to local turlough sites in this catchment area. Measures in CP-ACRES may support the positive management of turloughs. Details of participation in the ACRES scheme and of the uptake across relevant measures for turlough habitats are not currently available. It is therefore not possible to precisely assess the effects of implementation of these measures in the SAC network or this Annex I habitat in the wider countryside.

	Common high influence negative pressures on the turlough habitat, such as PA07 Intensive grazing/overgrazing by livestock or PA22 Drainage for use as agricultural land, could be addressed on a broader scale in part by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g., Waters of LIFE [LIFE18 IPE/IE/000003], Lough Carra LIFE [LIFE20 NAT/IE/000172]), the Department of Agriculture's ACRES agri-environment scheme, or national initiatives such as the enforcement of water quality standards (by local authorities, IFI, etc.).

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Future trend of Range is assessed as *stable*, as no change in range is expected. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is equal to the Favourable Reference Area. Future trend of Area is assessed as *stable*, as no change in area is expected. Future prospects of Area are therefore *Good*. Current Structure and functions are assessed as *Unfavourable-Inadequate* as 79% of the monitored habitat area was assessed as being in good condition. In the absence of data from the current reporting period, data reported for the 2013-2018 cycle (NPWS, 2019), and dating from 2006-2015 were reused for this assessment. Pollution, ecologically unsuitable grazing and drainage are ongoing pressures. Increased evidence of impacts from climate change and hydrological changes have been observed since the 2019 monitoring period. Short-term trend direction of Structure and functions is *uncertain* due to limited data collected in the current reporting period. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

<table>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / deteriorating / <u>stable</u> / unknown</td></tr>
<tr><td rowspan="8">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td><u>a) No, there is no difference</u></td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is Favourable in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area is Favourable in this reporting period, as it was in the previous reporting period.

The Conservation Status of Structure and functions and Future prospects are Unfavourable-Inadequate in this reporting period, as they were in the previous reporting period.

The Overall Conservation Status is assessed as Unfavourable-Inadequate, as it was during the last reporting period. The status of Unfavourable-Inadequate was due to less than 90% of the area of 3180 habitat assessed as being in good condition.

Trend in Overall Conservation Status was assessed as stable in this reporting period, as it was during the last reporting period.

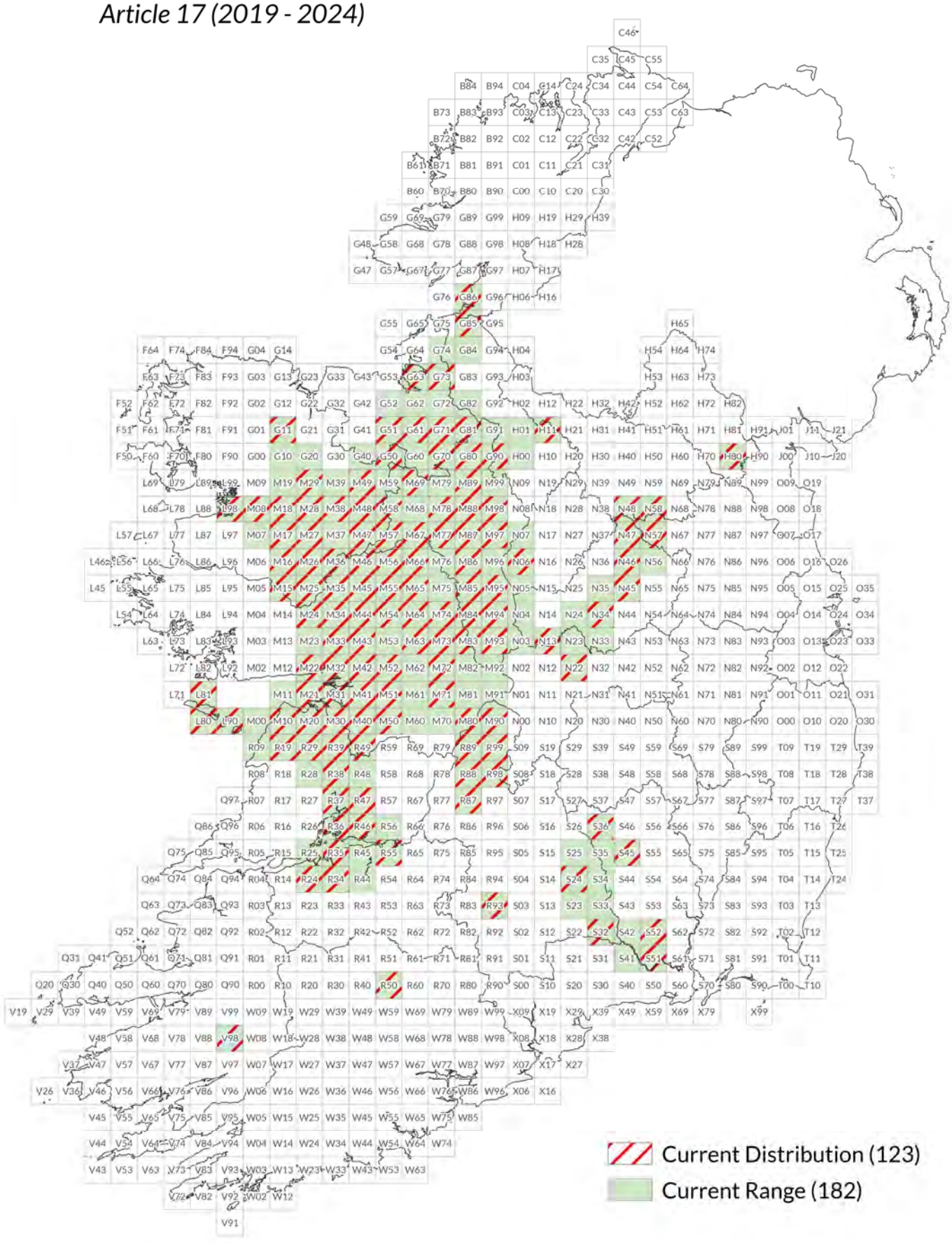
Habitat 3180 Turloughs is as assessed as Unfavourable-Inadequate and stable, as was reported in 2013 and 2019, with an unknown percentage of the habitat in good condition due to lack of assessment. Remote sensing and field survey by Geological Survey Ireland has improved knowledge of the distribution of the habitat and indicates Ireland may have in excess of 900 turloughs. The main pressures are drainage, water pollution, and ecologically unsuitable grazing, and at a wider landscape scale, flood relief schemes. Additionally, a recent study indicates early signs of climate change pressures in turloughs reflected in changes in hydrological regimes. Some measures have been implemented at a limited number of sites with this habitat.</td></tr>
</table>

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***36.9 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Based on the evidence in Waldren (2015) and O'Neill & Martin (2015), the condition of turloughs within the SAC network is better than in the wider countryside. The area of 3180 within the Natura 2000 network where it is listed as a QI is 35.7 km^2.	

12 Complementary information *N/A*

Turloughs* (3180)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**
1.2i Habitat short name	**Vegetation of flowing waters**
1.3i Habitat description	This Annex I habitat has a broad definition, covering from upland, flashy, oligotrophic, bryophyte- and algal-dominated rivers, to tidal reaches dominated by higher plants. In Ireland, the highest riverine conservation interest is associated with lowland depositing and tidal rivers and unmodified, fast-flowing, low-nutrient rivers. A number of rare submerged and marginal species are found in the former including Opposite-leaved Pondweed (*Groenlandia densa*), starworts (e.g. *Callitriche truncata*), Triangular Club-rush (*Schoenoplectus triqueter*), Needle Spike-rush (*Eleocharis acicularis*) and mud-dwelling mosses (e.g. *Ephemerum* spp.). The low-nutrient, high-velocity river types are associated with high bryophyte diversity, cascades, riffles and riparian woodland. Important communities also occur in groundwater-fed, base-rich oligotrophic rivers. Many Irish rivers have been heavily modified, particularly through arterial drainage and channelisation. These activities have changed channel morphology and introduced larger amounts of fine sediment. Such fines provide a rooting medium for plants and, as a result, Water-crowfoot (*Ranunculus penicillatus*) has increased in abundance. In consequence, the habitat has, erroneously, become synonymous with Water-crowfoot in Ireland. Crowfoot-dominated reaches frequently have low diversity and are of low conservation value, and an abundance of the species generally indicates poor condition and damage. The main problems for river habitats in Ireland are damage through hydrological and morphological change, eutrophication and other water pollution. The EPA is also continuing to highlight the decline in high quality rivers. While not all variants of the river habitat require low nutrient conditions, this trend is a significant concern. Agriculture and municipal and industrial discharges are the most significant sources of nutrient and organic pollution.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2019-2024***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution of habitat 3260 in Ireland was based on mapped rivers. All river segments, regardless of stream order, were used. The river segments were intersected with the Irish National 10 km Grid, producing a distribution of 822 10x10 km grid cells. Rivers are distributed across all counties. The only 10x10 km cells in which rivers do not occur are those with small areas of coastal land. The distribution is based on the occurrence of rivers, not of a particular type of river vegetation or river habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Bradley, C., Byrne, C., Craig, M., Free, G., Gallagher, T., Kennedy, B., Little, R., Lucey, J., Mannix, A., McCreesh, P., McDermott, G., McGarrigle, M., Ní Longphuirt, S., Lucey, J., McGarrigle, M., O'Boyle, S., Plant, C., Tierney, D., Trodd, W., Webster, P., Wilkes, R. & Wynne, C. (2015) *Water Quality in Ireland 2010-2012.* EPA, Wexford. Commission of the European Communities (CEC) (2013) Interpretation manual of European Union habitats. Eur 28. European Commission DG Environment, Brussels. Fanning, A., Craig, M., Webster, P., Bradley, C., Tierney, D., Wilkes, R., Mannix, A., Treacy, P., Kelly, F., Geoghegan, R., Kent, T. & Mageean, M. (2017) *2010-2015. EPA Water Quality in Ireland.* Environmental Protection Agency, Wexford. Government of Ireland (2018) *River Basin Management Plan for Ireland 2018 – 2021.* Prepared by the Department of Housing, Planning and Local Government. Government of Ireland (2024) *Water Action Plan 2024, A River Basin Management Plan for Ireland*. Prepared by the Department of Housing, Local Government and Heritage.

Hatton-Ellis, T.W. & Grieve, N. (2003) *Ecology of Watercourses Characterised by Ranunculion fluitantis and Callitricho-Batrachion Vegetation*. Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough.

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Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Rare and threatened Bryophytes of Ireland.* National Museums Northern Ireland Publication No. 028, Holywood, Co. Down.

Mainstone, C., Hall, R. & Diack, I. (2016) A narrative for conserving freshwater and wetland habitats in England. Natural England Research Reports Number 064.

Ní Chatháin, B., Moorkens, E. & Irvine, K. (2013) Management Strategies for the Protection of High Status Water Bodies. 010-W-DS-3. Strive Report Series No. 99. EPA, Wexford.

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Tierney, D. & O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. EPA, Wexford.

Trodd, W. & O'Boyle, S. (2018) Water Quality in 2017: An Indicators Report. EPA, Wexford.

Weekes, L., Kącki, Z., FitzPatrick, Ú., Kelly, F., Matson, R. & Kelly-Quinn, M. (2018) An Irish national vegetation classification system for aquatic river macrophytes. *Appl. Veg Sci.*,21, 322-340. DOI: 10.1111/avsc.12336.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants.* National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

Published conservation objectives:

NPWS (2011) Conservation Objectives: Slaney River Valley SAC 000781. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012) Lower River Shannon SAC (site code 2165) Conservation objectives supporting document- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (habitat code 3260). Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

	NPWS (2012) Conservation Objectives: Blackwater River (Cork/Waterford) SAC 002170. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. NPWS (2014) Conservation Objectives: Black Head-Poulsallagh Complex SAC 000020. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. NPWS (2014) Black Head–Poulsallagh Complex SAC (site code 20) Conservation objectives supporting document- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (habitat code 3260). Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. NPWS (2015) Conservation Objectives: Connemara Bog Complex SAC 002034. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. NPWS (2016) Conservation Objectives: The Gearagh SAC 000108. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2016) Conservation Objectives: The Gearagh SAC 000108 (site code 108). Conservation objectives supporting document - Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation and Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2017) Conservation Objectives: Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC 000365. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. NPWS (2017) Conservation Objectives: Owenduff/Nephin Complex SAC 000534. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2017) Conservation Objectives: Glanmore Bog SAC 001879. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2017) Conservation Objectives: Mweelrea/Sheeffry/Erriff Complex SAC 001932. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. NPWS (2017) Conservation Objectives: Cloghernagore Bog and Glenveagh National Park SAC 002047. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2018) Conservation Objectives: Moyree River System SAC 000057. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2021) Conservation Objectives: Ben Bulben, Gleniff and Glenade Complex SAC 000623. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2021) Conservation Objectives: Comeragh Mountains SAC 001952. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2021) Conservation Objectives: Templehouse and Cloonacleigha Loughs SAC 000636. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2021) Conservation Objectives: Unshin River SAC 001898. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

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Kelly-Quinn, M., Bradley, C., Dodkins, I., Harrington, T.J., Ní Chatháin, B., O'Connor, M., Rippey, B. & Trigg, D. (2005) Water Framework Directive – Characterisation of Reference Conditions and Testing of Typology of Rivers (2002-W-LS-7) Final Report. Environmental Protection Agency, Co. Wexford, Ireland.

O Connor, Á. (2016) Incorporating nature conservation objectives and measures into the Water Framework Directive. *Biology and Environment: Proceedings of the Royal Irish Academy*, 116B(3), 329-337. doi:10.3318/bioe.2016.29.

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	Preston, C.D. & Croft, J.M. (2001) *Aquatic Plants in Britain and Ireland.* Harley Books, Colchester. Rich, T.C.G., Hodd, R.L.I.B., McCosh, D.J., Mhic Daeid, E.C., McVeigh, A., Sawtschuk, J. & Wyse Jackson, M.B. (2008) Conservation of Ireland's biodiversity: A survey and assessment of the current status of three Irish endemic hawkweeds from Kerry, *Hieracium argentatum, H. scullyi* and *H. sparsifrons* (Asteraceae). *Biology and Environment: Proceedings of the Royal Irish Academy* 108B(3), 143-155. DOI: 10.3318/BIOE.2008.108.3.143 Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***82,200 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*		
4.9 Long-term trend Direction *Optional*		
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*		
4.12 Favourable reference range	***a) 82,200 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of a decline in range since the Directive came into force. As the range is based on the distribution of rivers, it covers most of the terrestrial grid and all counties. Therefore, the current range includes all Irish ecological variations of the habitat and is sufficiently large to allow the long-term viability of the habitat. As a result, the current range is set as the Favourable Reference Range.	
4.14 Additional information	The distribution was used as the range, i.e. the range tool was not used. The resultant range contained 822 10x10 km grid cells.	

Optional	Little is known about the characteristics or ecology of the 3260 habitat in Ireland. Weekes *et al*. (2018) described four main categories of river macrophyte communities and found that diversity was highest in bryophyte communities. Further study is needed to describe the high conservation value sub-types (ecological variants) of the habitat, typical species, ecological requirements and responses to anthropogenic pressures, in order to improve knowledge of the habitat's distribution and range. As the range is based on the distribution of rivers, and there is no evidence of a decline in the range of rivers, it is assumed that the short-term trend of Range is *stable*. Given the poor understanding and limited data on habitat 3260, no long-term trend has been reported.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***234 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	

Optional	**d) Unknown**	
5.9 Short-term trend **Magnitude** **Type of estimate**		
5.10 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*		
5.12 Long-term trend **Direction** *Optional*	*stable / increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend **Method used** *Optional*		
5.15 Favourable reference area	***a) 234 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	

5.16 Surface area when Directive came into force *Optional*	There is no evidence of a decline in area since the Directive came into force. The estimated surface area includes all Irish ecological variations as it includes all rivers, and is sufficient to ensure the long-term viability of the habitat type.
5.17 Additional information *Optional*	The surface area of habitat 3260 was based on the distribution of rivers. The area reported for the 2007-2012 cycle (234.9 km^2) was used as the estimated 'Best single value' surface area. This figure was based on the Inland Fisheries Ireland (IFI) Wetted Area data (based, in turn, on predictive modelling completed in 2012; see NPWS, 2013). Little is known about the characteristics or ecology of habitat 3260 in Ireland. Weekes *et al*. (2018) described four main categories of river macrophyte communities and found that diversity was highest in bryophyte communities. Further study is needed to describe the high conservation value sub-types (ecological variants) of the habitat, typical species, ecological requirements and responses to anthropogenic pressures, in order to improve knowledge of the habitat's distribution and area. As the area is based on the distribution of rivers, and there is no evidence of a decline in the area of rivers, it is assumed that the short-term trend in Area of habitat 3260 is *stable*. Given the poor understanding and limited data on habitat 3260, no long-term trend has been reported.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***126 km²***
		Maximum	***126 km²***
	b) Area in not-good condition	**Minimum**	***107 km²***
		Maximum	***107 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	Typical species have not been fully defined but may include higher plants, bryophytes, algae and invertebrates. Further work is required to fully describe the typical and characteristic species of habitat 3260. The list of typical species for habitat 3260 was based on the interpretation manual of EU habitats (CEC, 2013) and is the same as that reported for the 2007-2018 cycles: *Berula erecta*, *Callitriche* spp., *Fontinalis antipyretica*, *Myriophyllum* spp., *Potamogeton* spp., *Ranunculus aquatilis*, *Ranunculus peltatus*, *Ranunculus penicillatus*, *Ranunculus trichophyllus*, *Zannichellia palustris*. Further work is required to incorporate and build upon the work of Weekes *et al*. (2018).
6.8 Additional information *Optional*	Little is known about the characteristics or ecology of 3260 habitat in Ireland. Weekes *et al*. (2018) found a rich diversity of bryophyte communities within Irish rivers but lower diversity among vascular plant communities. Further study is needed to fully describe the high conservation value sub-types (ecological variants) of the habitat, their typical species, ecological requirements and responses to anthropogenic pressures, in order to improve knowledge of the habitat's structure and functions. In Ireland, many river communities represent an altered state caused by anthropogenic impacts on habitats, particularly changes in hydrology and morphology. In preparing site-specific conservation objectives for the habitat, efforts have been made to identify the site-specific vegetation and other communities of high conservation value (NPWS, 2011, 2012, 2014, 2015, 2016, 2017, 2018, 2021 and 2022). High conservation value sub-types are associated with natural hydrological regimes, including functioning floodplains. A natural flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis & Grieve, 2003). For many sub-types, high flows are required to maintain the substratum necessary for the characteristic species; others are characterised by high groundwater contribution; others by naturally, slow-flow and fine sediment deposition and/or tidal influence. The specific ecological requirements will vary among sub-types. Naturally base-rich and nutrient-poor rivers are likely to be the most threatened. As no dedicated monitoring programme exists for habitat 3260 in Ireland and a standard method for assessing its conservation condition at individual sites has not been developed, data on river water quality have been used to infer the status of the Structure and functions. It must be cautioned that the applicability of WFD tools to

	assessing the habitat's conservation condition has not yet been tested. The specific water quality targets are likely to vary among sub-types. The assessment used the data from the 2007-2012 cycle (NPWS, 2013), 2013-2018 (NPWS 2019) and incorporated EPA WFD data for 2016-2023 (Trodd *et al*. 2021, EPA 2023, EPA 2024). For the 2016-2021 period, 52% of monitored river water bodies were classified as being at high or good ecological status and 54% of the channel length was unpolluted (Government of Ireland, 2024). The areas of the habitat in good condition were based on the value of 54% channel length. It was assumed that the EPA WFD sample was fully representative and, therefore, that the condition was known for 100% of the habitat area. Although the estimated area in not-good (unfavourable) condition of 46% is greater than 25%, Structure and functions were assessed as *Unfavourable-Inadequate* overall, because confidence in the assessment is low given the poor knowledge of the distribution, ecology, conservation-value and water quality requirements of habitat 3260, including the applicability of WFD tools to assessing its conservation condition. There has been a 1% decline in the number of monitored rivers in satisfactory condition compared with the last assessment period. We are failing to protect our highest quality rivers; only 43% of rivers that have been given a high status objective have achieved that standard. The number of high ecological status (Q4-5 and Q5) river water bodies has continued to decline from 31.6% of sites in the 1987-1990 period, to 15.6% in 2013-2015, 15.4% in 2016-2018, 16.3% in 2019-2021 and 15.7% in 2020-2023 (EPA, 2023). While there was a minor improvement in the number of the most pristine sites (Q5) between 2020-2021, 39 and 30 sites, the long-term trend is of significant decline, from 13.4% of sites in the 1987-1990 period to just 1.2% in 2024. Overall, between 2010-2015 and 2016-2021 1,613 (60%) river water bodies remained stable, 603 (22%) improved and 484 (18%) declined in status. As the decline in high status sites is considered most relevant to the assessment of trends in conservation status, the short-term trend was assessed as *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Majority 50-90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Majority 50-90%	High
PA24 Agricultural crops for renewable energy production	Ongoing and likely to be in the future	Minority <50%	High

PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PF08 Industrial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	Majority 50-90%	Medium
PL06 Physical alteration of water bodies (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PL01 Abstraction from groundwater, surface water or mixed water (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Environmental Protection Agency (2025) EPA River Invertebrate Data (Q-value) 2007-2024. Available at: https://gis.epa.ie/GetData/Download. EPA (2023) Water Quality Monitoring Report on Nitrogen and Phosphorous Concentrations in Irish Waters 2022. Environmental Protection Agency, PO Box 3000, Johnstown Castle, Co. Wexford, Ireland. Feeley, H.B., Bradley, C., Free, G., Kennedy, B., Little. R., McDonnell, N., Plant, C., Trodd, W., Wynne, C. & O'Boyle, S. (2020) A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 7:280 | https://doi.org/10.1038/s41597-020-00618-8. Government of Ireland (2018) *River Basin Management Plan for Ireland 2018 – 2021*. Prepared by the Department of Housing, Planning and Local Government. Government of Ireland (2024) Water Action Plan 2024, A *River Basin Management Plan for Ireland*. Prepared by the Department of Housing, Local Government and Heritage. McGarrigle, M., Lucey, J. & Ó Cinnéide M. (2010) *Water Quality in Ireland 2007-2009*. EPA, Wexford.

	NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
7.4 Additional information *Optional*	Pressures and threats reported for the 2007-2012 and 2013-2018 cycles were used again for this cycle. NPWS (2013) detailed how these were based largely on the 2007-2009 EPA monitoring period (McGarrigle *et al*., 2010). In addition, reference was made to the Water Action Plan 2024 under the Water Framework Directive. This included an assessment of significant pressures impacting on water status for 42% or 1,337 river water bodies considered to be 'at risk' (Government of Ireland, 2024). Agriculture was identified as a significant pressure at 843 river water bodies, or 63% of 'at risk' rivers (Government of Ireland, 2024). Pressure code PA17 was used to cover agricultural pressures. The other significant pressures identified as impacting on the 'at risk' river water bodies were hydromorphology (PL05) at 428 (32%), urban waste-water (PF07) at 161 (12%), urban run-off (PF07) at 177 (13%), forestry (PB19) at 192 (14%), domestic waste-water (PF07) at 117 (9%), peat extraction (PC05) at 103 (8%) and industry (PF08) at 61 (5%) (Government of Ireland, 2024). Over 1,700 abstractions have been registered on the Water Abstractions register. It is also possible that abstractions may become a more significant threat, in combination with predicted droughts owing to climate change. Owing to their likely continuation, all pressures were also listed as threats. No genuine changes in pressures or threats were identified. Both the reporting form and Article 17 pressures and threats list have changed since Article 17 reporting in 2019.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA09 Manage the use of natural and synthetic fertilisers as well as chemicals in agricultural for plant and animal production MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MF04 Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures MK01 Reduce impact of mixed source pollution
8.7 Additional information *Optional*	Information is available from EPA river quality and other WFD data and analyses to broadly identify the conservation measures required to maintain or restore the habitat. These include:

	– reversal/rehabilitation of hydro-morphological changes, including in-stream structures and catchment drainage impacts/ restoration of hydrological regime; and – reducing pollution (with dissolved and/or particulate nutrients, humic substances, organic matter and fine sediment/turbidity) from agricultural, forestry, turf-cutting, and domestic and urban waste-water sources. There is on-going substantial investment by Uisce Éireann (Irish Water) in urban waste-water treatment and collection systems. During the period 2020-2024, there was investment in 108 waste water treatment plants, 77 collection networks and 92 related national programmes. Significant progress has also been made with domestic waste-water treatment systems through the inspection regime (under the Domestic Waste-Water Treatment Regulations) and associated grant scheme. Implementation of the Water Framework Directive (WFD) in Ireland does not currently integrate the water-related ecological requirements of water-dependent Annex I habitats or Annex II species into its objectives and programmes of measures. Ireland's third River Basin Management Plan (RBMP), 'Water Action Plan 2024', was published in September 2024 (Government of Ireland, 2024). It contains, as an action (3.8): "The water-related requirements of water-dependant habitats and species will be reviewed by the Water Division, the National Parks and Wildlife Service and the EPA during the third RBMP cycle, taking account of the most recent scientific evidence. If necessary, proposals for updating the related water standards will be made and this will be integrated into the catchment management process." Site-specific conservation objectives for 3260 in the 21 SACs designated for its protection were published between 2011 and 2022. The Programmes of Measures under the WFD River Basin Management Plan will help to improve water quality generally; however the WFD's default option of 'Good ecological status' may not account for site-specific variations and, therefore, may not be sufficient to return habitat 3260 to favourable conservation status. While further work is needed to identify effective, practical and iterative solutions and to establish interim targets, sub-types of this habitat require oligotrophic or WFD high status in Ireland (NPWS, 2013; O Connor, 2013, 2015). It also requires particular hydrological and morphological conditions (NPWS, 2011, 2012, 2014, 2015, 2016, 2017, 2018, 2021 and 2022). Given the resources invested in the Local Authority Water Programme and the Agricultural Sustainability Support and Advisory Programme, particularly the catchment managers and scientists and agricultural advisors, the WFD should assist in maintaining and improving the conservation condition of Annex I freshwater habitats and Annex II species in SACs. To ensure the correct measures are implemented, consideration must be given to the site-specific conservation objectives and ecological requirements of the habitat/species, as well as specific information on conservation condition and impacting pressures.

	WFD programmes do not, therefore, constitute adequate conservation measures to protect or restore the habitat to favourable status, however any measures to reduce diffuse pollution to surface or ground waters from agricultural and residential activities (MA09, MA10, MF04, MK01) should improve water quality and have an impact on habitat condition. Agricultural measures to protect water quality are being implemented through a range of mandatory (e.g. the Nitrates Action Programme and Good Agricultural Practice Regulations) and voluntary initiatives (e.g. LAWPRO-ASAP farm advisory services, the Agri-Climate Rural Environment Scheme (ACRES) Co-operation Projects, Waters of LIFE IP, Farming for Water EIP). Enforcement has also been improved under the National Agricultural Inspection Programme, with additional staff in local authorities and the EPA. Overall, significant focus is being placed on as yet unproven source control measures (e.g. increased slurry storage) and pathway interception measures (e.g. buffers) rather than source reduction measures. There is also a general lack of sufficient information on nutrient sources (in terms of field-scale livestock density and applications of chemical fertilisers and slurry) and nutrient pathways (in terms of drainage channels and pipes) to develop targeted source control measures such as detailed nutrient management plans. A total of 216 waterbodies have been identified as 'At Risk' from forestry activities. Forestry measures for water quality consist of mandatory requirements and voluntary schemes. While various schemes are now available to support restructuring of plantation forests post clear-felling, no effective measures have been identified to prevent water quality impacts on high-risk sites during forest felling and forest road construction, and there are limited/no DAFM schemes available to fund either water quality mitigation measures during these operations, or to remove plantations and restore open habitats (peatland, other wetland, grassland, etc.). There is insufficient focus, therefore, on managing the large legacy of inappropriately sited conifer plantations on blanket peat and other organic soils. Changes in the state of aquatic ecosystems, such as nutrient enrichment or hydrological changes, have multiple drivers and sources, especially when, as for Article 17, summarised at regional or national scale. Therefore, a large number of the new standard list of conservation measures are applicable and some measures may have more than one function (e.g. changes to grazing regime to prevent pollution, restore hydrological function, enhance biodiversity, etc.). Based on the assessment of the pressures impacting on habitat 3260, measures are required to address pollution from agriculture (MA10, , MA09, MA13, MA11, MA01, MA03, MA05, MA06, MA08), hydromorphological damage (MK02, MK03, MC04, MF08, MA13, MA07, MB14, ME06, MF02), urban waste-water (MF04), forestry (MB10, MB14, MB09, MB11, MB04, MB01), on-site systems (unsewered) (MF05), urban run-off and industry (MF05), peat extraction (MC08, MC01, MC02), and abstraction pressures (MF09, MF10).

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The Future prospects of the Range, Area and Structure and functions of habitat 3260 were assessed by reference to pressures and threats and conservation measures, as well as each parameter's future trends and current status: *Pressures and threats:* Four pressures of high influence and five of medium importance were recorded and all were listed as threats, owing to their likely continuation. These pressures and threats result in changes in hydromorphology and water quality and, therefore, have a negative influence on the status of the habitat's Structure and functions. *Conservation measures*: Limited targeted conservation measures are currently being undertaken to maintain, restore or enhance areas of 3260 habitat, either within SACs or the wider countryside. It will take time to identify conservation measures based on the ecological requirements of the habitat, combined with the site-specific conservation objectives, conditions and significant pressures and threats; and there is likely to be a significant time-lag before conservation measures, once implemented, take effect (e.g. measures to reverse hydrological damage to peat and other organic soils). Therefore, conservation measures cannot halt or reverse the negative influence of the threats in the next 12 years. Greater integration of water-related ecological requirements/conservation objective targets of habitat 3260 into the WFD objectives, status or risk assessments, plans or programmes of measures is required. *Range:* The short-term trend of Range was assessed as *stable*. The current range is equal to the Favourable Reference Range and considered to include all significant Irish ecological variations of the habitat and to be sufficiently large to allow the long-term viability of the habitat. Therefore, the Conservation Status of Range is *Favourable*. The future trend of Range is, therefore, likely to remain *stable* and the Future prospects of Range have been assessed as *Good*. *Area:* The short-term trend of Area was assessed as *stable*. The estimated surface area of the habitat is equal to the Favourable Reference Area and is considered sufficient to ensure the long-term viability of the habitat type. Therefore, the Conservation Status of Area is *Favourable*. The future trend of Area is, therefore, likely to remain *stable* and the Future prospects of Area have been assessed as *Good*. *Structure and functions:* The short-term trend in Structure and functions was assessed as *decreasing*, based on the on-going decline in High Status rivers sites. Although the estimated area in not-good (unfavourable) condition was 46%, Structure and functions were assessed as *Unfavourable-Inadequate* overall, because confidence in the assessment is low. While measures under the WFD RBMP should help improve water quality generally, addressing the loss of High	

	Status sites will be a significant challenge and will involve a time-lag. Therefore, the predicted future trend has been assessed as *negative*. The Future prospects of the Structure and functions were, therefore, assessed as *Poor*. As the Future prospects of Structure and functions were assessed as *Poor*, the Future prospects for habitat 3260 were assessed as *Unfavourable-Inadequate* overall.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	*Range:* As the range is based on the distribution of rivers, it covers most of the terrestrial grid and all counties. Therefore, the current range includes all Irish ecological variations of the habitat, is sufficiently large to allow the long-term viability of the habitat and is equal to the Favourable Reference Range. The short-term trend of Range was assessed as *stable*. Therefore, the Conservation Status of Range was assessed as *Favourable*. *Area:* The estimated surface area of the habitat is equal to the Favourable Reference Area and includes all Irish ecological variations	

	and is sufficient to ensure the long-term viability of the habitat type. There is no evidence of a decline in area since the Directive came into force (*stable* short-term trend). As a result, Area was assessed as *Favourable*. *Structure and functions:* Biological and physico-chemical data were available from the WFD for 2,343 river sites. 54% of water bodies were at High or Good Ecological Status in 2016-2021. 50.4% of river channel length monitored 2016-2021 was at High or Good Ecological Status, therefore 49.6% was in not-good status. The short-term trend in Structure and functions was assessed as *decreasing*, based on the on-going decline in High Status rivers sites. 31.6% of sites in the 1987–1990 period were at High Status, 15.6% in 2013-2015, 15.4% in 2016-2018, 16.3% in 2019-2021 and 15.7% in 2020-2023 (EPA, 2023). Confidence is low, however, in both the condition and trend assessments as general water quality indicators have been used in the absence of habitat specific indicators and data. Therefore, although area in not-good condition is >25%, Structure and functions were assessed as *Unfavourable-Inadequate*. *Future prospects:* The Future prospects of Range and Area were assessed as *Good*. The Future prospects of Structure and functions were assessed as *Poor*. Therefore, Future prospects were assessed as *Unfavourable-Inadequate* overall. As Area, Structure and functions and Future prospects were assessed as *Unfavourable-Inadequate*, the Overall Conservation Status of habitat 3260 was assessed as *Unfavourable-Inadequate*. As in the 2007-2012 and 2013-2018 cycles, the overall trend was assessed as *deteriorating*, based on the identified pressures and limited targeted conservation measures, leading to a predicted *negative* future trend in Structure and functions. Further study is needed to fully describe the high conservation value sub-types (ecological variants) of habitat 3260, their typical species, ecological requirements and responses to anthropogenic pressures, in order to improve knowledge of the habitat's structure and functions. As well as developing specific conservation condition assessment methods for habitat 3260, the applicability of the WFD elements/metrics used above needs to be tested. Assessing Structure and functions and Overall trends will continue to be a challenge. Even where dedicated and standardised monitoring and assessment methodologies are in use, data will be too temporally infrequent to estimate or quantify the trend magnitude or identify when changes in trend occur. There has been no genuine change or improved knowledge, in fact 50% of channel length was reported as polluted in both water quality monitoring cycles 2016-2021.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***17 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The surface area of habitat 3260 inside the network was based on the distribution of rivers. The area calculated for the 2007-2012 cycle of 17 km² within the 21 SACs designated for the protection of habitat was reported as the best single value. The trend of the habitat area in good condition within the network was based on the decline in high status sites, from 31.6% of sites in the 1987–1990 period 15.6% in 2013-2015, 15.4% in 2016-2018, 16.3% in 2019-2021 and 15.7% in 2020-2023 (EPA, 2023). While there	

	was a minor improvement in the number of the most pristine sites (Q5) between 2020-2021, 39 and 30 sites, the long-term trend is of significant decline, from 13.4% of sites in the 1987-1990 period to just 1.2% in 2024 (Government of Ireland, 2024).

12 Complementary information *N/A*

Vegetation of flowing waters (3260)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**3270 Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation**
1.2i Habitat short name	**Chenopodion rubri**
1.3i Habitat description	In Ireland, Chenopodion rubri habitat occurs in riverine turloughs where it is associated with late recession of flood water and summer flooding. However, the largest known site for Chenopodion vegetation in Ireland is Carrigadrohid Reservoir at the Gearagh, Co. Cork. The habitat is found on damp mineral soils, often fine, alluvial muds, but also stony substratum. Typical species are small, short-lived, fast-growing annuals. These are poor competitors that occupy the habitat because it is exposed for too little time and too late in the growing season to allow perennial species to complete their life cycles. The on-going development of this habitat depends on a continuous supply of fine sediment. Most sites receive sediment from external sources via streams or large underground conduits. Wave action can lead to erosion, re-suspension and subsequent deposition of sediment within a basin. Direct losses of the habitat have occurred, as well as indirect owing to prolonged flooding. Reduced flood duration is also a threat. Pressures on the habitat include infrastructure, drainage and other land uses.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1992-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	Conaghan (2024) revisited eight sites in 2024, surveying six and building on a previous national survey from 2018 (Conaghan & Fuller, 2018). An additional site at Lough Eagle, Buttevant, Co. Cork, has been included based on survey information from 1992 (FitzGerald, R., Saich, C. & Smiddy, P., 1992-1993).

	A small area of Chenopodion vegetation was re-surveyed at Kilcolman Bog, Co. Cork in 2024 by NPWS staff (pers. comm. 2025). This site was excluded from the 2019 distribution; however, it is now included but considered a 'poorly developed' example of this habitat. Since the last reporting period, the N22 Macroom Bypass, Co. Cork, has been constructed at the Gearagh, Picnic site, South Hartnett's Cross (Site No. 11 in Conaghan & Fuller, 2018). This has resulted in an estimated loss of 1 ha (min) to 3 ha (max) of this habitat, but does not change the habitat's distribution. In 2018, Conaghan & Fuller (2018) surveyed 19 sites, including all known sites for the habitat. They confirmed the occurrence of the habitat at 15 sites. Three sites that could not be surveyed in 2018 were retained within the distribution, based on previous survey data (see Goodwillie, 2007; NPWS, 2013). This includes Lough Funshinagh, where the habitat has not been seen since 2004. It has been retained within the distribution although it is very likely that it has not occurred at the site since 2016 because of the continuously high water levels. Similarly, Glenamaddy has been retained within the distribution despite high water levels on visits since 2018. The locations for these sites were intersected with the 10x10 km national grid, resulting in a distribution of fifteen 10x10 km grid cells (1,500 km^2). The sites at Lough Eagle and Kilcolman add two contiguous 10x10 km cells to the distribution, R50 and R51. A second 10x10 cell (M94) was added to the distribution to cover the extent of the habitat recorded at Funshinagh in 2004.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic,*** *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Conaghan, J. (2024) A survey of the vegetation of the habitat "Rivers with muddy banks with Chenopodium rubri p.p. and Bidention p.p. vegetation" (3270), in selected sites in counties Galway, Clare and Roscommon. Unpublished Report to the National Parks and Wildlife Service, DHLGH, Dublin. https://www.npws.ie/sites/default/files/publications/pdf/Chenopodion-habitat-survey-2024.pdf. Conaghan, J. & Fuller, J. (2018) A survey of the vegetation of the Habitats Directive Annex I habitat Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation (3270), in Ireland (2018). Unpublished Report to the National Parks and Wildlife Service, DCHG, Dublin.

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NPWS (2016b) The Gearagh SAC (site code: 108) Conservation Objectives supporting document – 3260 and 3270. V1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Dublin. https://www.npws.ie/sites/default/files/publications/pdf/The%20Gearagh%20SAC%20(000108)%20Conservation%20objectives%20supporting%20document%20-%20[Version%201].pdf.

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	Additional information Conaghan, J., Roden, C. & Fuller, J. (2006) A Survey of Rare and Scarce Vascular Plants in County Galway. Vols 1-3. Unpublished report to National Parks and Wildlife Service, Dublin. FitzGerald, Lady R. (1984) The Gearagh – a rare habitat in County Cork. *BSBI News* 36 (April 1984), 8-9. Goodwillie, R.N. (1992) Turloughs over 10ha: Vegetation survey and evaluation. Unpublished report to the National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/Goodwillie_1992_Turloughs.pdf. Goodwillie, R. (1995) Additions to the Irish range of *Rorippa islandica* (Oeder ex Murray) Borbas. *Irish Naturalists' Journal,* 25(2), 57–59. Goodwillie, R. (1999) *Alopecurus aequalis* Sobol., new to Clare (H9) and S.E. Galway (H15). *Irish Naturalists' Journal,* 26(7/8), 286–287. Goodwillie, R.N. (2003) Vegetation of Turloughs. In: M.L. Otte (ed.) *Wetlands of Ireland: Distribution, Ecology, Uses and Economic Value.* University College Dublin Press. Pp 135-144. Goodwillie, R., Heery, S. & Keane, S. (1997) Wetland vegetation on the Gort lowlands. In: An Investigation of the Flooding Problems in the Gort–Ardrahan Area of South Galway. Ecology Baseline Study Vol. I (Southern Water Global and Jennings O'Donovan and Partners eds.). The Office of Public Works, Dublin. pp. 1–131. Louman, E. (1984) The vegetation of the Coole turlough area (Western Ireland). Interne Rapporten Hugo de Vries Laboratorium Nr 184. University of Amsterdam. McGough, H.N. (1983) Field trip to the Gearagh, Macroom, Co. Cork 19-21 August, 1983. *Bulletin Irish Biogeographical Society,* 7, 55-57. Morrissey, P., Nolan, P., McCormack, T., Johnston, P., Naughton, O., Bhatnagar, S. & Gill, L. (2021) Impacts of climate change on groundwater flooding and ecohydrology in lowland karst. *Hydrology and Earth System Sciences,* 25, 1923-1941. https://doi.org/10.5194/hess-25-1923-2021. NPWS (2016c) Conservation Objectives: Lough Lurgeen Bog/Glenamaddy Turlough SAC 000301. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000301.pdf. NPWS (2016d) Lough Lurgeen Bog/Glenamaddy Turlough SAC (site code: 301) Conservation Objectives supporting doc- turloughs and rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation. V1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Dublin. https://www.npws.ie/sites/default/files/publications/pdf/Lough%20Lurgeen%20Bog%20Glenamaddy%20Turlough%20SAC%20(000301)%20Conservation%20objectives%20supporting%20document%20%E2%80%93%20Turloughs%20[Version%201].pdf. NPWS (2017) Conservation Objectives: Lough Gash Turlough SAC 000051. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

	https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000051.pdf. NPWS (2018) Conservation Objectives: Caherglassaun Turlough SAC 000238. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000238.pdf. NPWS (2018) Conservation Objectives: Lough Funshinagh SAC 000611. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000611.pdf. NPWS (2021) Conservation Objectives: Peterswell Turlough SAC 000318. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000318.pdf. NPWS (2024) Conservation Objectives: Coole-Garryland Complex SAC 000252. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000252.pdf. O'Mahony, T. (1986) Some recent additions to the Cork flora. *Irish Naturalists' Journal,* 22(1), 40-43. O'Mahony, T. (2002) A report on the flora of Cork (v.cc. H3-H5), 2001. *Irish Botanical News,* 12, 27-35. Roden, C., Conaghan, J., Fuller, J. & Reynolds, S. (2006) A Survey of Rare/Threatened and Scarce Vascular Plants in County Clare. Unpublished report to National Parks and Wildlife Service, Dublin. Waldren, S. (2015) (ed.) Turlough hydrology, ecology and conservation. Unpublished report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/Project_Report_consolidated_all.pdf, https://www.npws.ie/sites/default/files/publications/pdf/Site_reports_all.pdf. White, J. (1985) *Limosella aquatica* L. and the vegetation of exposed mud at the Gearagh, Co. Cork (H3). *The Irish Naturalists' Journal*, 21(12), 509-515.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***2,100 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change*

	c) yes, due to improved knowledge/more accurate data *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / increasing / decreasing /* ***uncertain*** */ unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*		
4.9 Long-term trend Direction *Optional*	*stable / increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*		

4.12 Favourable reference range	***a) 2,100 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the habitat. A maximum gap distance of two 10x10 km grid cells was used. The resultant range contained 21 10x10 km cells. The range has increased by five 10x10 km grid cells as a result of improved information on the distribution of the habitat at Lough Eagle, Kilcolman and Lough Funshinagh (see section 2.5). Lough Funshinagh has been retained within the distribution although the habitat has not been seen there since 2004 and is unlikely to have occurred since 2016, owing to the continuously high water levels. Loss of the habitat at Lough Funshinagh would mean a reduction in the range of two 10x10 km grid cells (200 km^2), therefore the short-term trend is reported as *uncertain*. See sections 5.17, 7.4 and 9.2 for further description of changes at Funshinagh.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	**1992-2024**	
5.2 Surface area *(in km^2)*	**a) Minimum**	***0.6 km²***
	b) Maximum	***1.1 km²***
	c) Best single value	

5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend **Period**	***2013-2024***	
5.7 Short-term trend **Direction**	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend **Magnitude**	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is Unknown***
5.9 Short-term trend **Magnitude** **Type of estimate**		
5.10 Short-term trend **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*	***2000-2024***	

5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*		
5.15 Favourable reference area	***a) 1.24 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high**/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The minimum and maximum area figures reported for the 2013-2018 cycle (NPWS, 2019) were updated based on new information. Conaghan (2024) surveyed six sites in 2024, building on the previous national survey from 2018 (Conaghan & Fuller, 2018). The results found that a smaller area of habitat was exposed in 2024 due to higher water levels but there was no indication of genuine habitat area reduction at the sites surveyed. The area of habitat 3270 is expected to naturally vary among years with flooding regime. Glenamaddy and Funshinagh were also visited but were not accessible again in 2024 due to high water levels. The 2024 estimated areas for the six surveyed	

	sites were used in the reported minimum area and are considered within the natural temporal variation in the habitat's extent. The known sites were visited by Conaghan & Fuller (2018). Extent of habitat was estimated in the field, where possible. This is a difficult habitat to quantify accurately due to its seasonality and variable water levels, however 2018 was an exceptionally dry summer and good area estimates could be made for most locations of this habitat. Four sites were not accessible at Glenamaddy, Funshinagh, Mountpleasant, and a site at the Gearagh. The 2018 area estimates of Conaghan & Fuller (2018) were used in calculating the maximum area. Estimates from earlier reports (Goodwillie, 2007; NPWS 2013) were used for sites not surveyed in 2018. Lough Eagle, Buttevant, Co. Cork, has been included in the distribution based on survey information from 1992 (FitzGerald *et al*., 1992-1993). Minimum and maximum area estimates of 0.2-0.5 ha were generated using GIS, based on their sketch map. A small area of Chenopodion vegetation was re-surveyed at Kilcolman Bog, Co. Cork in 2024 by NPWS staff (pers. comm. 2025). This site was excluded from the 2019 distribution; however, it is now included but considered a 'poorly developed' example of this habitat. The 2018 estimated area of habitat at Kilcolman of 0.2 ha (Conaghan & Fuller, 2018) was used in the minimum and maximum area estimates. Since the last reporting period, the N22 Macroom Bypass, Co. Cork, has been constructed and has resulted in an estimated loss of 1 ha (min) to 3 ha (max) of this habitat and unknown loss of mapped *Limosella aquatica* plants at the Gearagh, Picnic site, South Hartnett's Cross (Site No. 11 in Conaghan & Fuller, 2018). It is estimated, based on aerial imagery, that there may be 1 ha (min) to 2.8 ha (max) of the habitat remaining, based on likely direct and indirect loss at this site. The 2.8 ha maximum is based on the mapped area in Conaghan & Fuller (2018) that lies outside of the infrastructure built since then. This represents 43-75% area loss at that site. The estimated area of the habitat at Lough Funshinagh, Co. Roscommon in 2004 was 33 ha (Goodwillie, 2007). GSI data show that flood levels have remained consistently high (65.5 mAOD to above 69 mAOD) since 2016, with an area of 365 ha flooded 90% of the time (Naughton *et al*., 2021). Hydrological modelling also shows that water levels have been high (generally above 66 mAOD) at Lough Funshinagh since late 2007 (Naughton *et al*., 2021). It is considered unlikely, therefore, that the habitat has been present at Lough Funshinagh since at least 2016, and likely 2007, so the estimated minimum area of habitat at this site during the reporting period (2019-2024) is 0 ha and the maximum is 1 ha (based on expert judgement examining aerial imagery and water level data). It is expected that the habitat would re-emerge from the seed bank if appropriate water level fluctuations were restored. Naughton *et al.* (2021) found a substantial shift in the hydrological operation of Lough Funshinagh after a 2016 flood event, resulting in persistently high water levels. This shift is not explained by rainfall, and is likely to have resulted from anthropogenic activities. Changes must, therefore, have occurred in the outflow pathways from Lough Funshinagh, and/or in the in-flow pathways to the turlough.

	While it is possible that natural processes may be partly responsible for these changes, it is also likely that land uses contributed, e.g. through soil or waste material blocking swallow-holes or underground conduits, construction leading to below ground collapses or land drainage changing catchment area or inflow characteristics. In summary, the reported change in area at Funshinagh is considered to be a genuine, if reversible, loss and it is considered likely that anthropogenic pressures are at least partially responsible for the loss in habitat area. It has not been possible to survey the habitat at Glenamaddy because of flooding. Further work is needed to determine whether high water levels now persist at this site and have resulted in a loss of habitat area. The area of habitat 3270 is expected to vary significantly, inter-annually, with flooding regime, however the losses in area documented at the Gearagh, Picnic site, South Hartnett's Cross (Macroom Bypass) and Lough Funshinagh represent genuine decreases in the area of the habitat during the reporting period. In consequence, the short-term trend is reported as *decreasing*. The habitat loss at the Gearagh is likely to be permanent, however it is considered probable that reinstatement of seasonal water level fluctuations at Lough Funshinagh would result in restoration of the habitat. In the absence of estimated area losses at the Gearagh, Picnic site, South Hartnett's Cross and Lough Funshinagh, the minimum and maximum estimated areas for the 2019-2024 cycle would have been 0.94 km^2 and 1.43 km^2, respectively. The Favourable Reference Area of 1.24 km^2 reported in 2013 and 2019 (NPWS, 2013, 2019) has been retained as it is within this range and is considered to be sufficient for the long-term survival of the habitat. The estimated surface area during the current reporting cycle is at least 11% below the Favourable Reference Area. However the habitat naturally varies in area each year.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.53 km²***
		Maximum	***1.00 km²***
	b) Area in not-good condition	**Minimum**	***0.02 km²***
		Maximum	***0.04 km²***
	c) Area where condition is not known	**Minimum**	***0.05 km²***
		Maximum	***0.07 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES****/NO***
6.7 Typical species Method used *Optional*	The full list of typical species for 'Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation' (3270) (see O Connor, 2017; Conaghan and Fuller, 2018) is as follows: *Callitriche palustris* [VU] *Chenopodium rubrum (Oxybasis rubra)* *Gnaphalium uliginosum* *Limosella aquatica* *Persicaria minor* *Rorippa islandica* *Alopecurus aequalis* [NT] *Eleocharis acicularis* *Riccia cavernosa* Regional Red List status (Wyse Jackson *et al*., 2016) is given, where relevant, as a superscript. Other species associated with habitat 3270 include *Atriplex prostrata, Rorippa palustris, Persicaria hydropiper, Juncus bufonius* and *Bidens tripartita*.
6.8 Additional information *Optional*	Notes from individual site reports compiled by Conaghan (2024) and Conaghan & Fuller (2018) were examined to estimate the area in poor condition. Conaghan (2024) resurveyed six of the sites surveyed by Conaghan & Fuller (2018) and found that the conservation status had improved at one site, declined at three sites and was stable at two sites. In general, Conaghan (2024) found that the level of poaching and grazing in 2024 was lower than 2018. This is likely due to the more typical wetter summer conditions in 2024 compared to the very dry summer in 2018, reducing the impact from grazers. Glenamaddy and Lough Funshinagh remained flooded and inaccessible for survey in this reporting period. Based on the results of Conaghan (2024) and Conaghan & Fuller (2018): – 12 sites with a total area of 0.53-0.99 km^2 were in good condition

	– 4 sites with a total area of 0.02-0.04 km^2 were in not-good condition and – 4 sites with a total area of 0.05-0.07 km^2 were in uncertain condition. In total, therefore, approximately 89% of the area of 3270 was in good condition, and 3-4% in not-good condition. As the percent area is close to the 90% threshold, and given the ephemeral nature of the habitat, and the evidence of reduced grazing and poaching pressures in 2024, the habitat's Structure and functions parameter is assessed as *Favourable*. Soil damage (poaching) and the occurrence of 'weedy' species were the only notable pressures, and were associated with heavy livestock grazing and trampling. Four sites were assessed as being in poor condition as a result of damage by livestock (see Lynn & O Connor, Appendix II in Conaghan & Fuller, 2018). The non-native plant species *Cyperus eragrostis* was widespread at the Gearagh as reported in 2018; however, there was no clear evidence of negative impacts on the habitat. The species is known from the Gearagh since at least 2001 and should be monitored for invasive behaviour and impacts on the Chenopodion vegetation. Since the last reporting period, the N22 Macroom Bypass, Co. Cork, has been constructed and has resulted in an estimated loss of 1-3 ha (min-max) of this habitat at South Hartnett's Cross, Picnic site (Site no. 11) and unknown loss of mapped *Limosella aquatica* plants. This may have impacted on the condition of a wider area of this habitat. Naughton *et al.* (2021) found a substantial shift in the hydrological operation of Lough Funshinagh after a 2016 flood event, resulting in persistently high water levels. This shift is not explained by rainfall, and is likely to have resulted from anthropogenic activities (see also 5.17). The typical hydrological function at Lough Funshinagh has, therefore, been absent since 2016 or before, and the area where 3270 habitat occurs, reported in 2007 as 33 ha (Goodwillie, 2007), has not been exposed for at least the past 8 years. It is still uncertain as to the true cause of this change in hydrological function, but both natural below-ground changes and land use pressure may have contributed. Glenamaddy Turlough, Co Galway also appears to have changed in hydrological function, reportedly remaining in flood condition longer into the summer in recent years, however it is understood the turlough does still drain and it is expected that 3270 habitat is still present when it does. The conservation condition of Glenamaddy was assessed as *uncertain* for the 2019-2014 reporting cycle. Ecological and hydrological monitoring of Glenamaddy is needed.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PD02 Hydropower (dams, weirs, run-off-the-river and respective infrastructure)	Ongoing and likely to be in the future	Majority 50-90%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF14 Modification of flooding regimes, flood protection for built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R04712 *Cyperus eragrostis*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* ***c**) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Conaghan, J. (2024) A survey of the vegetation of the habitat "Rivers with muddy banks with Chenopodium rubri p.p. and Bidention p.p. vegetation" (3270), in selected sites in counties Galway, Clare and Roscommon. Unpublished Report to the National Parks and Wildlife Service, DHLGH, Dublin. Conaghan, J. & Fuller, J. (2018) A survey of the vegetation of the Habitats Directive Annex I habitat Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation (3270), in Ireland (2018). Unpublished report to the National Parks and Wildlife Service, DCHG, Dublin. Morrissey, P., Nolan, P., McCormack, T., Johnston, P., Naughton, O., Bhatnagar, S. & Gill, L. (2021) Impacts of climate change on groundwater flooding and ecohydrology in lowland karst. *Hydrol. Earth Syst. Sci*., 25, 1923–1941, https://doi.org/10.5194/hess-25-1923-2021.
7.4 Additional information *Optional*	This is an opportunistic and ephemeral habitat that thrives on high disturbance from changes in hydrological regime. Therefore, no one pressure is of particular threat to this habitat.

	Conaghan & Fuller (2018) recorded notable pressures during their site visits. PA07 'Intensive grazing or overgrazing by livestock resulting in poaching' (i.e. damage to integrity of the soil) was reported at four of the 18 sites and was severe in two of these sites. Conaghan (2024) noted this pressure was more moderate to absent in eight sites visited in 2024, and overall lower than that observed in 2018. PI02 'Other invasive alien species (other than species of Union concern)': the non-native *Cyperus eragrostis*, was noted in three sites, but there was no clear evidence of negative impacts on the habitat. It is therefore assigned a low importance as a pressure, but has been listed as a threat of medium importance on a precautionary basis. *Cyperus eragrostis* will be monitored at the Gearagh. PD02 'Hydropower (dams, weirs, run-off-the-river and respective infrastructure)' was listed as a pressure because the habitat at the six sites in the Gearagh is dependent on the operation of hydropower dams. Currently, the management supports significant areas of the habitat (0.45-0.59 km^2) and favourable structure and functions. Changes to the hydropower scheme would be likely to negatively impact on the habitat, unless specifically designed to maintain or increase its area. PE01 'Roads, paths, railroads and related infrastructure' was used to cover the loss of habitat to the N22 Macroom by-pass at the Gearagh, Picnic site, South Hartnett's Cross (Site No. 11). PF14 'Modification of flooding regimes, flood protection for built-up areas' and PL05 'Modification of hydrological flow (mixed or unknown drivers)' were used to cover on-going and proposed flood-relief schemes (FRS) at Lough Funshinagh and south Galway, designed to protect rural housing, roads, other developments, infrastructure and agricultural land. These could negatively impact on the habitat or, if appropriately designed, could restore, maintain or increase its area. These proposed FRS are in the design stages, but affect six 3270 sites, and it is uncertain what the scale and significance of the threat will be. PL05 was also used to cover land drainage for agricultural and other land uses which can negatively impact the habitat by either decreasing the flood duration, allowing perennial plants to take over, or result in permanent flooding, leading to habitat loss. Similarly, PJ03 'Change in precipitation regimes due to climate change' is reported as both a pressure and threat because hydrological analyses have shown changes in turlough flooding patterns linked to changing precipitation regimes (Morrissey *et al.*, 2021) that could impact the habitat through shorter or longer flood durations.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)
8.7 Additional information	Livestock (MA06), as well as vehicles and people, are excluded from most of the area of the Carrigadrohid Reservoir at the Gearagh. This

Optional	management contributes significantly to the good condition of the habitat's structure and functions. The ESB commissioned a 2018 survey of the Chenopodion vegetation at the Gearagh (Delaney, 2018) and is incorporating its findings, and the site-specific conservation objectives for the habitat (NPWS, 2016a,b), into its draft site environmental management plan for the Gearagh. Measures may be required to reduce livestock pressures on other sites for Chenopodion vegetation. These could include reduction of grazing intensity or alteration of the timing of grazing, and particularly to monitor and reduce livestock pressure during drier years, where grazers can be present longer, and poaching increases around water sources. The development of conservation plans and measures for this marginal and ephemeral habitat must consider its associated habitats, particularly turloughs, and the wider context of each site. There may be a need to control the non-native species *Cyperus eragrostis* at the Gearagh if it expands and negatively impacts on the habitat. Flood-relief schemes, if appropriately designed, could restore the area and structure and functions of the habitat at Lough Funshinagh, and maintain or increase its area at south Galway sites. The schemes also have significant potential to negatively impact on the habitat by reducing flood durations.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / Poor / Bad /* ***Unknown***
	b) Area	Good */ Poor / Bad /* ***Unknown***
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	Current range is equal to Favourable Reference Range. Short-term trend direction of Range is assessed as *uncertain*. Owing to the threat from proposed flood-relief schemes (FRS), which could lead to loss of up to six 3270 sites (three 10x10 km grid cells in the distribution) the future trend of Range is assessed as *uncertain*. Therefore, the Future prospects of Range are assessed as *Unknown*. Short-term trend direction of Area is assessed as *decreasing*. Current area is at least 11% less than the Favourable Reference Area. Future trend of Area is assessed as *uncertain*, again owing to the uncertainty of proposed FRS. Future prospects of Area are therefore *Unknown*. 89% of area is assessed as being in good condition. Given the ephemeral nature of the habitat, and the evidence of reduced grazing and poaching pressures in 2024, and the fact that percent area in good condition is close to the 90% threshold, the habitat's Structure and functions are assessed as *Favourable*. Short-term trend direction of Structure and functions is *stable*. Future trend is *stable* and therefore Future prospects of Structure and functions are *Good*.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1****) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / Bad (U2) /* ***Unknown (XX)***	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*improving /* ***deteriorating*** */* stable */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): ***genuine change*** */ improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change*** */ improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	Current range is equal to the Favourable Reference Range. Short-term trend direction of Range is assessed as *uncertain*. Therefore, the Range is assessed as *Favourable*. Losses of habitat have been documented at Funshinagh, Glenamaddy and Macroom, therefore short-term trend direction of Area is assessed as *decreasing*. Current area is at least 11% less than the Favourable Reference Area. However the habitat naturally varies in area each year. Therefore the Area is assessed as *Unfavourable-Inadequate*. Due to the ephemeral nature of this habitat, as just under 90% (89%) of the area has been assessed as being in good condition, and the short-	

	term trend is *stable*, Structure and functions have been assessed as *Favourable* overall. Future prospects of Range and Area are assessed as *Unknown*, owing to the threat of the proposed FRS. Future prospects of Structure and functions are assessed as *Good*. Overall, Future prospects are assessed as *Unknown*. While the most significant threat to this habitat is likely from proposed FRS, ongoing pressures related to animal stocking and non-native species, other hydrological regime changes (drainage), and climate change need to be addressed. Overall assessment of Conservation Status is therefore *Unfavourable-Inadequate*. Overall trend in Conservation Status is assessed as *deteriorating* as the short term trend in Range is *uncertain*, the Area is *decreasing*, and the Structure and functions are *stable*. Increased surveying and monitoring work is required in the next reporting cycle.

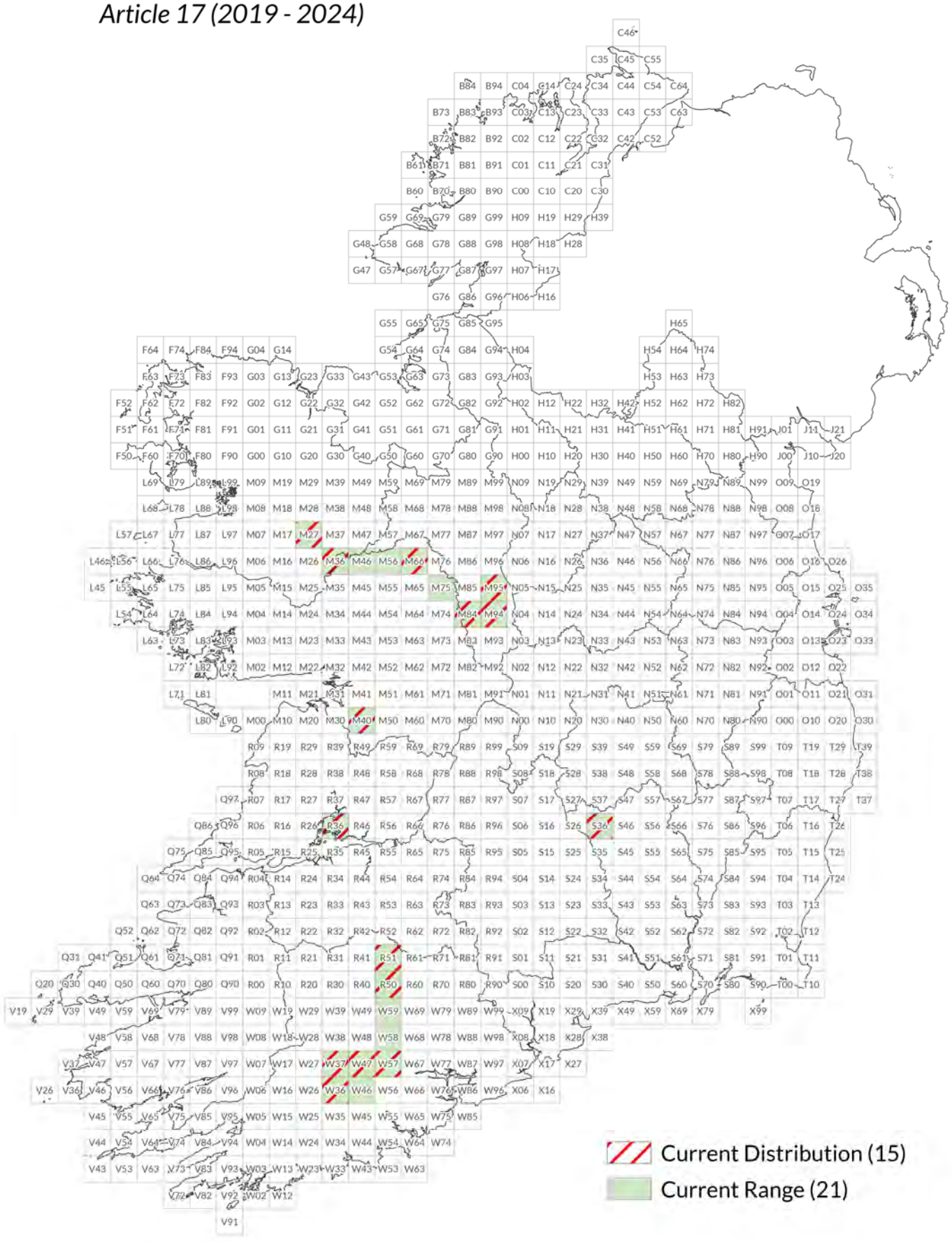
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***0.51 km²***
	b) Maximum	***0.98 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	All SACs that have this habitat were surveyed by Conaghan & Fuller (2018). Eight sites were revisited in 2024, seven of these are in SACs, five of which were resurveyed. The trend of area in good condition within the network is considered to be the same as the national trend.

12 Complementary information *N/A*

Chenopodion rubri (3270)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**4010 Northern Atlantic wet heaths with *Erica tetralix***
1.2i Habitat short name	**Wet heaths**
1.3i Habitat description	4010 Wet heath is a highly variable peatland habitat that is intermediate in many regards between dry heath and blanket bog, generally occurring on gently sloping, poorly draining ground, on shallow or intermediate peat depths (typically < 50 cm deep). It is characterised by a mix of *Molinia caerulea, Erica tetralix, Trichophorum germanicum* or *Calluna vulgaris*, and locally *Myrica gale,* although not all of these species must be present for the habitat to qualify as wet heath. Dwarf shrubs may be scarce or absent in degraded examples of wet heath characterised by dominance of *Trichophorum germanicum* or *Molinia caerulea*. Ground cover is variable but *Sphagnum* mosses such as *S. capillifolium*, *S. papillosum, S. compactum, S. tenellum*, *S. subnitens* and pleurocarpous mosses such as *Pleurozium schreberi* and *Hylocomium splendens*, along with lichens of the *Cladonia* genus, would be characteristic. Wet heath may support communities with affinities to the *Ericion tetralicis*, *Oxycocco-Ericion tetralicis*, *Daboecion cantabricae* and *Calluno-Genistion pilosae* associations (Perrin, 2024). According to the Irish Vegetation Classification (Perrin, 2024) most examples of the *Calluna vulgaris – Molinia caerulea – Erica cinerea* heath community (HE2D) and *Molinia caerulea – Calluna vulgaris – Erica tetralix* heath community (HE4E) occur in habitat 4010, and elements of other communities within the *Erica cinerea – Calluna vulgaris* (HE2), *Vaccinium myrtillus – Racomitrium lanuginosum* (HE3), *Molinia caerulea – Polygala serpyllifolia* (HE4) heath groups and *Erica tetralix – Sphagnum capillifolium* (BG2) bog group can also occur.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1949-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted.

2.5 Additional information *Optional*	The distribution map was derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4010 or Fossitt code HH3 (Fossitt, 2000), a relevant NPWS or Irish Vegetation Classification (IVC) habitat code or the National Land Cover (NLC) class 'Wet heath'. Sources added to the distribution map this reporting period are: five National Survey of Upland Habitats (NSUH) sites (Rigoni *et al*. 2023; Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), Barron & Mackin (2022), Crowley *et al.* (2023), Crushell *et al.* (2021), Foss *et al*. (2021), Hodd (2023), Martin *et al.* (in prep., 2023), O'Neill *et al.* (2021), Scott Cawley (2021), Smith & D'Arcy (2020), Lydon & Smith (2023), the National Fen Survey 2021 to 2023 dataset (Brophy *et al.,* in prep.), NPWS Farm Plans (2019-2023) and the BirdWatch Ireland CABB habitat surveys. In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: 15 NSUH sites (Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012), Barron & Daly (2015a, 2015b), Coillte Biodiversity Dataset (various dates), Daly & Barron (2014, 2015), Daly (2016), Foss *et al.* (2014, 2015), Galway County Council (2017), Hodd (2015), O'Neill & Martin (2018), O'Neill *et al.* (2013a, 2020), Perrin (2024) which comprises data ranging from 1949 to 2013, Tubridy *et al.* (2015), Wilson & Duff (2014), Anon (1998, 2005, 2006, 2010), Barron & Perrin (2010, 2011), Ballycroy, Burren and Connemara National Park Habitat Maps, Cooper *et al.* (2012), Crushell & Foss (2008), Crushell & O'Callaghan (2008), Crushell *et al.* (2012), Foss & Crushell (2012), Foss *et al.* (2012, 2014, 2015), Hickey & Tubridy (2009), Murphy & Fernandez (2009), NPWS (2013a), NPWS Habitat Assignment Project, O'Donoghue *et al.* (2008, 2011), O'Neill *et al.* (2013) and Wilson & Foss (2011). GIS files from the Ahascragh road AA (Galway County Council), the Carlow Pilot Habitat Mapping Project (Carlow County Council), the Cavan Wetland Survey (Cavan County Council), Dún Laoghaire Rathdown habitat survey (Dún Laoghaire Rathdown County Council), the Mayo Local Area Surveys (Mayo County Council), South Clare Habitat Map Cratloe to Parteen (Clare County Council) and Uplands and Peatlands Grazing Survey (NPWS) were also utilised. All references are detailed below in Section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. Certainty values from the datasets utilised during the last reporting period were not reassigned for the purposes of the distribution map. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron S.J. & Mackin F. (2022) Fiddandarry Bog, Co. Sligo Monitoring Report. Unpublished report for Birdwatch Ireland by BEC consultants and RPS Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. BirdWatch Ireland CABB surveys (2019-2020). GIS files for this INTERREG VA project were made by BirdWatch Ireland & NPWS. Brophy *et al*. (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Crowley, W., Vanmechelen, A., O'Sullivan, J. Crushell, P. & Foss, P. (2023) County Mayo Wetlands Field Survey II 2023. Report prepared for Mayo County Council. Crushell, P., Gallagher, M.C. & Foss, P. (2021) County Longford Wetlands Field Survey III 2021. Report prepared for Longford County Council. Foss, P., Gallagher, M.C., Kirwan, B. & Crushell, P. (2021) Title: County Kilkenny Wetlands Field Survey 2021. Report prepared for Kilkenny County Council. Hodd, R. (2023) Habitat and botanical survey of the wild atlantic rainforest Knockaunbaun site, Maamturks, Co. Galway. Report for Hometree, Ennistymon, Co. Clare. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***75,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude	**a) Estimated Minimum**	
	b) Estimated Maximum	

Optional	**c) Pre-defined range**	
	d) Unknown	
4.6 Short-term trend **Magnitude** **Type of estimate** *Optional*		
4.7 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend **Period** *Optional*	***2000-2024***	
4.9 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km²*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*

	☐ ***Expert opinion***
	☐ *Other (elaborate in Additional information 4.13)*
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 4010 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Short-term trend for Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). There was no loss of range caused by the recorded losses of area during these two reporting periods. The short-term trend in Range is judged to be *stable*. Due to improved knowledge from additional survey sources in the current reporting period, there is a 154 10x10 km grid cell increase between the last reporting period (605 cells) and the current reporting period (759 cells). These changes are primarily due to the inclusion of the National Land Cover (NLC) wet heath polygons (Lydon & Smith, 2023) this reporting period. Refinement of data this reporting period resulted in the removal of four 10x10 km grid cells (G76, M35, N71, N82) from the mapped 4010 distribution compared to NPWS (2019). The Favourable Reference Range (FRR) is based on the premise used in NPWS (2007) that the current estimate of range is the FRR as there has been no decline since the Directive came into force in 1994, and no enlargement of range is deemed necessary to ensure the long-term survival of the habitat. The FRR is approximately equal to the current range, reported in section 4.1. The FRR has been increased since the last reporting period (NPWS, 2019) to reflect the improved level of knowledge.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1949-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2,906.57 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="2">5.5 Change and reason for change in surface area</td><td colspan="2">Is there a change between reporting periods?
(If yes, more than 1 option a) to f) can be chosen)
a) no, there is no change
<u>b) yes, due to genuine change</u>
<u>c) yes, due to improved knowledge/more accurate data</u>
d) yes, due to the use of different method
e) yes, but nature of change is unknown
f) yes, due to other reasons</td></tr>
<tr><td colspan="2">The change is mainly due to (select one of the reasons below):
a) genuine change
<u>b) improved knowledge or more accurate data</u>
c) the use of a different method
d) unknown
e) other reasons</td></tr>
<tr><td>5.6 Short-term trend Period</td><td colspan="2">2013-2024</td></tr>
<tr><td>5.7 Short-term trend Direction</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="4">5.8 Short-term trend Magnitude
Optional</td><td>a) Estimated Minimum</td><td></td></tr>
<tr><td>b) Estimated Maximum</td><td></td></tr>
<tr><td>c) Pre-defined range</td><td>Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.
☐ <u>0 – 12%</u>
☐ 13 - 25%
☐ 26 - 50%
☐ 51 – 100%
☐ >100%</td></tr>
<tr><td>d) Unknown</td><td></td></tr>
<tr><td>5.9 Short-term trend Magnitude Type of estimate</td><td colspan="2">Best estimate / multi-year mean / 95% confidence interval / minimum/<u>pre-defined range</u></td></tr>
<tr><td>5.10 Short-term trend Method used</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend Period
Optional</td><td colspan="2">2000-2024</td></tr>
</table>

5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ ***between 2% and 10% smaller than the FRA*** ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	Unknown	
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 1949 when bog and heath relevés were recorded by Braun-Blanquet and Tüxen (data utilised in Perrin, 2024) and incorporates updates made by surveys up until 2023. A full list of these resources is presented in section 3.4. Area was calculated from the polygon shapefile and point shapefile used for distribution. Each point record located more than 50 m from	

	a polygon had 10 ha of habitat applied. This is a conservative estimate based on the logic that 4010 habitat can cover substantial areas. The reported surface area of 4010 has increased from 1,598.51 km² in NPWS (2019) to 2,906.57 km² this reporting period, largely due to the inclusion of data from the NLC (Lydon & Smith, 2023). Section 5.3 was amended from 'minimum' in NPWS (2019) to 'best estimate' this reporting period. This change is due to the inclusion of the National Land Cover (NLC) wet heath polygons (Lydon & Smith, 2023) this reporting period. NLC polygons were derived from remote sensing and machine learning. The accuracy of NLC in identifying wet heath is 73% according to the F1 Score (%) presented in Lydon & Smith (2023), though this validation is based on aerial photograph interpretation, not field verification. Despite these reservations the distribution map now has national coverage for this habitat. Area loss has not been determined through systematic review as there is no monitoring network for the habitat. The current area loss assessment uses data from the National Survey of Upland Habitats (NSUH), NPWS (2019), personal communications with NPWS staff, as well as wind farm and landslide datasets. Of the datasets used to map the 4010 distributions, loss of area was only fully assessed during NSUH surveys. Twenty-one NSUH datasets were used in the Area assessment (Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b; Rigoni *et al*. 2023, Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012). Twenty out of the 21 NSUH sites are within SACs, therefore, losses within these sites are not fully representative of the losses occurring outside the SAC network where losses would be expected to be larger. These 21 datasets represent 9.7% of the total area of 4010 habitat. To estimate other losses, particularly those occurring outside the SAC network, two other national datasets were used. The methodology used to extract losses from these national datasets is presented below. The default trend periods used are those presented in sections 5.6 and 5.11. A wind farm point location shapefile from SEAI's Wind Atlas dated June 2022 was sourced (https://data.gov.ie/dataset/wind-farms-in-ireland). This dataset was used to estimate area loss by comparing the locations of wind farms to the 4010 polygon and point distribution shapefiles. Wind farm points that overlapped or were within 50 m of a mapped 4010 feature had an estimated area loss of 1 ha applied. The 'Year of Construction' field in the wind farm dataset was used to determine the time period the loss occurred. This analysis derived a conservative estimate of 24 ha of 4010 habitat loss from wind farms developments since 2013 (45.8% of the loss occurred this reporting period), and 54 ha of loss from wind farms developments since 2000. These figures are considered minimum losses from this activity. A Geological Survey Ireland (GSI) landslide extent dataset was sourced (GSI, 2024). This dataset mapped boundaries of recorded landslides. It was intersected with the 4010 polygon and point distribution shapefiles to determine the area of potential loss. The 'Year' field in the landslide dataset was used to determine the timing of the event. This analysis indicated 7.2 ha of potential loss from landslides since

	2013 (34.9% of the loss occurred this reporting period), and 8.4 ha of potential loss since 2000. While not all landslide events will result in permanent loss of the 4010 habitat (especially if residual peat remains), some events will leave only the subsoil or rocky substrate remaining rendering it unsuitable for wet heath recolonisation. A further 282 ha of landslides events intersected the 4010 dataset. These data could not be used, as no 'Year' was assigned to the event. Considering the unassigned 282 ha of landslides within 4010 (some of which may represent permanent loss within the relevant time periods), the 7.2 ha and 8.4 ha of potential loss derived from the above analyses were considered actual loss for the purpose of determining trend. These figures are considered minimum losses from this activity. Short-term trend direction for Area was determined to be *decreasing*. Since 2013, approximately 1.62 ha of 4010 habitat within four NSUH sites (Ballyhoura Mountains SAC (002036), Sonnagh Bog SAC (001913), Glendree Bog SAC (001912) and Slieve Bloom Mountains SAC (000412)) were determined to have been lost. Activities these losses were attributed to are: invasive species, paths and tracks, afforestation and recreational erosion (Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a; Rigoni *et al.* 2023). In addition to this, spatial analyses assigned 24 ha of loss from wind farms since 2013, and 7.2 ha of loss from landslides since 2013. During the previous reporting period, NPWS (2019) reported 0.09 ha of 4010 loss to tracks and site clearance within Corraun Plateau SAC (000485). The total derived area of 4010 habitat lost since 2013 is approximately 32.91 ha. The NSUH datasets indicated small gains in area at one of the 21 NSUH sites since 2000 but none within the current reporting period. During the last reporting period, there was a 1.2 ha increase in 4010 within Slieve Mish Mountains SAC (002185) (Perrin *et al.* 2014a) due to revegetated tracks and recolonised bare/disturbed peat. However, these gains were not enough to counteract losses at either this site or nationally. The magnitude of the known loss was calculated as 0.0009% per annum measured over a period of 12 years. Although the magnitude of known loss is less than 1% per annum, actual losses of 4010 are likely to be significantly higher. Long-term trend direction for Area was determined to be *decreasing*. Since 2000, approximately 44.56 ha of 4010 habitat within 16 of the 21 NSUH sites were lost. This indicates that losses in area are occurring across the geographic spread of 4010 habitat. Activities responsible for losses at NSUH sites since 2000 are: paths and tracks, forestry, peat extraction, agricultural intensification, landslides, mining/quarrying, erosion, roads, buildings and drainage activities. Spatial analyses assigned 54 ha of 4010 habitat loss from wind farms since 2000, and 8.4 ha of loss from landslides since 2000. When the 0.09 ha of loss reported in NPWS (2019) is included, the total derived area of 4010 habitat lost since 2000 is approximately 107.05 ha. There are no readily available data on land-use change from 4010 habitat to forestry. The Department of Agriculture, Food and the Marine highlighted that afforestation of unenclosed land (predominantly made up of peat type soils) peaked in 1995 with over

	6,000 ha planted per annum, but since 2006 there has been a steep decline with 265 ha of unenclosed land planted in 2011, and approximately 100 ha of unenclosed land planted in 2013 (NPWS, 2015; Renou-Wilson & Byrne, 2015). However, the 4010 habitat can also occur on enclosed lands. Farrell & Renou-Wilson (2008) reported that in 2006, a total of 8,012 ha of new plantations were established nationally; 2,323 ha (29%) of this were on peat soils, mainly on blanket peatland. Data released under Access to Information on the Environment (AIE) indicated that in 2015, approximately 5,300 ha of forestry were approved for planting on peat soils (Sargent, 2020). However, the latter figure cannot reliably be used to determine area loss of heath/bog due to afforestation, since extensive areas of peat soils (c. 339,300 ha) are also under grassland (Duffy *et al.* 2023). Afforestation on 4010 habitat was reported at five NSUH sites: Caha Mountains SAC (000093) lost 1.64 ha between 2005-2014, Mount Brandon SAC (000375) lost 11.59 ha and 19.35 ha between 1995-2000 and 2000-2005, Mweelrea/Sheeffry/Erriff Complex SAC (001932) lost 0.9 ha between 2000-2005, Nephin Mountain lost an undocumented area in 2003 and Slieve Bloom Mountains SAC (000412) lost 0.17 ha between 1995-2022. NPWS field staff have highlighted that loss of heath habitat to forestry has likely occurred within the current reporting period (NPWS, pers. comm.). Favourable Reference Area is deemed to be more than the current area, but less than 10% more, given that anthropogenic losses have occurred since the Directive came into force. Based on all NSUH sites surveyed to date, there has been a loss of 91.25 ha of 4010 habitat since 1995. Twenty of the 21 NSUH sites are within SACs. The Sustainable Uplands Agri-environment Scheme (SUAS) EIP project (2018-2022) assessed area loss of 4010 habitat within participating commonages in the Wicklow/Dublin uplands from the 1990s onwards. While exact areas (ha) were not reported, the activities causing 4010 loss included: overgrazing, land reclamation, agricultural improvement, burning, erosion and scrub encroachment. All but one of the participating commonages with reported 4010 habitat loss were in Wicklow Mountains SAC (004040). Losses of 4010 habitat outside of SACs are likely to be higher due to lower levels of protection and scrutiny, however no systematic national review of losses of 4010 have been conducted. Analysis of the 4010 mapped distribution and the SAC shapefile (SAC_2024_05_Matrix.shp) indicates 61.9% of 4010 habitat lies outside of the SAC network.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***424.36 km²***
		Maximum	***1,186.98 km²***
	b) Area in not-good condition	**Minimum**	***1,719.59 km²***
		Maximum	***2,482.2 km²***
		Minimum	***0 km²***

	c) Area where condition is not known	**Maximum**	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	Typical species for 4010 habitat are: *Breutelia chrysocoma, Calluna vulgaris, Carex* spp., *Diplophyllum albicans, Drosera* spp., *Erica erigena, Erica tetralix, Eriophorum angustifolium, Myrica gale, Narthecium ossifragum,* non-crustose lichens, *Pedicularis sylvatica,* pleurocarpous mosses, *Pleurozia purpurea, Polygala serpyllifolia, Potentilla erecta, Rhynchospora* spp., *Salix repens, Schoenus nigricans, Sphagnum* spp., *Succisa pratensis* and *Trichophorum germanicum*.		
6.8 Additional information *Optional*	Perrin *et al.* (2014c) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. There is no national monitoring network for the 4010 habitat, though monitoring stop data for the current reporting period were available from a limited number of sites from the NSUH, the SUAS EIP and LIFE IP Wild Atlantic Nature (WAN). A total of 71 monitoring stops were recorded in 4010 habitat across five NSUH sites within this reporting period. Of the 71 stops, 30 (42.3%) failed one or more of the criteria assessing the vegetation composition, vegetation structure and physical structure of the habitat. Data for 35 monitoring stops recorded in 4010 habitat as part of the SUAS EIP (2018-2022) in the Wicklow/Dublin uplands were collated.		

	Of the 35 stops, 23 (65.7%) failed one or more of the assessment criteria. Data from one LIFE IP WAN project site was made available for the current assessment. Surveys of Owenduff/Nephin Complex SAC (000534) were conducted in 2023/24 with 85 stops in 4010 habitat. Of the 85 stops, 60 (70.6%) failed one or more of the criteria. Combining the data from the NSUH, SUAS EIP and LIFE IP WAN gives a total of 191 monitoring stops. Of these 78 stops passed (40.8%) the Structure and functions assessment and 113 stops failed (59.2%). When these percentages are applied to the national area of 4010 habitat (2,906.57 km²), 1,186.98 km^2 is good condition and 1,719.59 km^2 is unfavourable ('not-good') condition. As these data are based on a limited dataset with a poor national distribution and sample size, data from the last reporting period were also utilised. During the previous reporting period, 14.6% of the 4010 habitat was assessed as good condition and 85.4% in not-good condition (NPWS, 2019). These same percentages were applied to the current area of 4010 habitat to derive the minimum area in good condition (424.36 km²) and maximum area in not-good condition (2,482.2 km²). The maximum area in good condition and minimum area in not-good condition are based on data from the current reporting period. The short-term trend period is considered to be *stable*. During the previous reporting period (NPWS, 2019), 14.6% of the 4010 habitat was in good condition and in this reporting period 40.8% is in good condition. While this could be interpreted as an *improving* trend, direct comparison between the datasets is not possible. The data available from both monitoring periods have been collected on an *ad hoc* basis rather than repeated assessments from a national monitoring network, and they are both based on a limited dataset with a poor national distribution and sample size. The *stable* assessment is based on expert opinion. When the 191 stops from the current reporting period are reviewed, the most frequent criteria to fail the Structure and functions assessment were 'signs of drainage resulting from heavy trampling or tracking or ditches' (29.8%), 'cover of *Cladonia, Sphagnum, Racomitrium lanuginosum* and pleurocarpous mosses' (28.8%) and 'cover of positive indicator species' (24.1%). The most frequent criteria to fail the Structure and functions assessment in the last reporting period were 'cover of ericoid species and *Empetrum nigrum'*, 'cover of *Cladonia, Sphagnum, Racomitrium lanuginosum* and pleurocarpous mosses' and 'cover of positive indicator species' (NPWS, 2019). Due to the limited coverage of the assessment plots these failures may reflect site-specific issues rather than the national trend. As with the Area assessment, the majority of the data utilised for the Structure and functions assessment were from SACs. The area of 4010 habitat in good condition outside of SACs is likely to be significantly less due to lower levels of protection and scrutiny.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	High
PA18 Agricultural activities generating air pollution	Ongoing and likely to be in the future	Minority <50%	High
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	High
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Low
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low
PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R11544 *Picea sitchensis* R18691 *Pinus contorta* subsp*. contorta* R12976 *Rhododendron ponticum* R03227 *Cervus nippon* R04810 *Dama dama*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Aherne, J., Wilkins, K. & Cathcart, H. (2021) Nitrogen-Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats. EPA Research Report No. 390. McCumiskey House, Richview, Clonskeagh, Dublin 14. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. European Innovation Partnerships (EIPs) project websites and online publications (where available): Blackstairs Farming Futures (BFF) EIP (https://assets.gov.ie/291923/fcfdc3f0-5358-4a86-a3de-98f4b0489bd6.pdf); Sustainable Uplands Agri-environment Scheme (SUAS) EIP (https://wicklowuplands.ie/suasproject/suas-documents/); and Inishowen Uplands EIP (https://www.inishoweneip.com/). Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) Annual Fire Reports. Accessed from: https://forest-fire.emergency.copernicus.eu/reports-and-publications/annual-fire-reports. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union,

	1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Personal communications with Senior NPWS staff including NPWS Upland Habitats Ecologist, Regional Managers and District Conservation Officers. Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Site Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., J. Bailey, & O'Toole, L. (2024) The 2022 National Survey of breeding Hen Harrier in Ireland. Report prepared by Irish Raptor Study Group (IRSG), BirdWatch Ireland (BWI), Golden Eagle Trust (GET) for National Parks and Wildlife Service (NPWS). *Irish Wildlife Manuals*, No. 147. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Sargent, N. (2020) Ireland's tree-planting policies are bad news for biodiversity. *The Journal*. Accessed from: https://www.thejournal.ie/spruced-up-pt1-5241271-Oct2020/.
7.4 Additional information *Optional*	Pressures and threats presented in section 7.1 were selected and ranked based on intensity (high, medium, low), frequency of occurrence, and area of impact where data were available. EIP project data were only used where the project documentation specifically assigned a pressure or threat to a specific Annex I habitat or Fossitt (2000) equivalent. There is no national monitoring network for 4010 and data from the current reporting period represents only a small proportion of the data collected on upland habitats to date. Therefore, the pressure and threat data used to inform the previous reporting periods (NPWS 2019, 2013b) were reviewed, with expert judgement applied as necessary to evaluate their continued relevance. PA07 'Intensive grazing or overgrazing by livestock' was identified as a high-influence pressure. Overgrazing can reduce diversity of the 4010 vegetation, cause damage and lead to erosion. During the current reporting period, this impact was recorded from one of the five NSUH sites surveyed. Slieve Bloom Mountains SAC (000412) had sheep overgrazing recorded as having a medium negative effect over a limited area (Rigoni *et al.,* 2023). The SUAS EIP (2018-2022) reported sheep overgrazing within 4010 habitat. NPWS staff in the northern counties noted overgrazing was one of the main pressures acting on upland habitats (NPWS, pers. comm.). Another NPWS staff member noted that "all of the designated peatland habitats in west Galway and southwest Mayo are under pressure from overgrazing by sheep,

	resulting in large tracts of these habitats likely being in unfavourable conservation status. This pressure is widespread and intensive in nature and by far the greatest pressure on, and threat to, the integrity and proper functioning of this habitat" (NPWS, pers. comm.). A third NPWS staff member noted "sheep overgrazing is still an issue on most sites in the north midlands area" (NPWS, pers. comm.). PA08 'Extensive grazing or undergrazing by livestock' was identified as a low-influence pressure, having not been considered a pressure on the 4010 habitat during the previous reporting period (NPWS, 2019). Undergrazing, signified by the presence of rank 4010 habitat, was reported by the Blackstairs Farming Futures EIP (2018-2023) and Inishowen Uplands EIP (2019-2023). PA09 'Burning for agriculture' was identified as a high-influence pressure during the current and the previous reporting period. The code PH04 'Vandalism or arson (incl. human-introduced wildfire)' was also added during the current reporting period as a high-influence pressure. These pressures can lead to widespread loss and degradation of upland habitats (Perrin *et al.* 2014c). Unregulated burning can reduce plant species diversity and the ericoid component of the vegetation, as well as often causing significant damage to the bryophyte layer. Burning also contributes to peat erosion, desiccation of the habitat and may encourage the spread of *Pteridium aquilinum*, a problematic native species, and grasses, particularly *Molinia caerulea*, which can become dominant to the exclusion of most other species. Burns that are too frequent or severe can result in habitat loss (Glaves *et al.* 2013). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) annual reports were reviewed (https://forest-fire.emergency.copernicus.eu/reports-and-publications/annual-fire-reports). In 2019, 3,700 ha of non-forest land was affected by fire in Ireland. The 2019 report notes that a significant number of upland fires occurred close to the end of the permitted season for controlled burning, particularly in and around Wicklow Mountains National Park. In April 2019, a fire took place in Killarney National Park, with another large-scale fire that burned 1,000 ha in Annagry, Co. Donegal. In 2020, 3,500 ha of non-forest land was affected by fire, with agricultural land including upland areas used for grazing accounting for 1,750 ha of the total area burned. The 2021 annual fire report notes that 3,100 ha of non-forest land was affected by fire. Illegal agricultural burning was observed during March and into early April 2021, notably in Counties Wicklow and Laois. Another fire took place in Killarney National Park in April 2021, covering over 2000 ha of mountain terrain. In 2022, 2,900 ha of non-forest land was affected by fire, with 5,600 ha affected in 2023. The majority of the observed fires in 2023 occurred in the first quarter, predominantly in south-western Counties, being strongly associated with burning extensive agricultural land used for upland grazing. To further analyse the direct impacts of these fires on the 4010 habitat, an EFFIS burnt area shapefile for the Republic of Ireland, based on MODIS imagery, was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped 308 large fire

	events in the Republic of Ireland covering 18,590 ha. The 4010 polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. These indicate that approximately 4,702 ha of 4010 habitat were subject to a large burn event during this reporting period. Four of the five NSUH sites surveyed this reporting period noted 4010 habitat impacted by recent burns. Recent burns impacted 5.1% of the 4010 within Ballyhoura Mountains SAC (002036), 5.0% of 4010 within Sonnagh Bog SAC (001913), 38.2% of 4010 within Loughatorick South Bog SAC (000308) and 20% of 4010 within Slieve Bloom Mountains SAC (000412). EIP projects that reported damaging fires within 4010 habitat included the SUAS EIP (2018-2022) and Blackstairs Farming Futures EIP (2018-2023). The SUAS EIP identified uncontrolled burning as the main activity resulting in the unfavourable condition of many of the commonages and upland farms assessed. Fires within the Wicklow Mountains have been mapped by NPWS. These data highlight that some commonages have been burnt repeatedly in recent years, leaving no time for habitat recovery between burns. Regular uncontrolled fires prompted the Wicklow Upland Council (WUC) to condemn these events in 2019, with the group noting that 'the Wicklow and Dublin Uplands have seen a rise in the extent and frequency of unregulated burning in recent years, highlighting a greater need for controlled burning practices to be implemented'. The Blackstairs Farming Futures EIP report noted that while the project was operational it "helped to encourage the continued management of the heathland habitats, and a moratorium on burning reduced the number of fires on the hills. However, the project failed to establish protocols with state bodies for controlled burns and now fires are increasing in the area once more". NPWS staff from west Galway noted that "illegal burning of vegetation, while being less widespread than overgrazing and more seasonal, is a persistent and locally intensive pressure" (NPWS, pers. comm.). Another NPWS staff member reported a 44.7 ha fire in April 2022 within and surrounding Arroo Mountain SAC (001403) with both *7130 and 4010 habitats impacted (NPWS, pers. comm.). PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' was recorded as a high-importance pressure in NPWS (2019) based on expert judgement and was retained as high-influence pressure this reporting period. Afforestation can result in direct habitat loss, as well as fragmentation of the 4010 habitat. NSUH surveys reported loss of 4010 habitat to afforestation at five of the 21 sites surveyed to date, four of these NSUH sites were SACs. The 'Land Types for Afforestation' publication (DAFM, 2017) regards sites with an average peat depth <50 cm, which are *Molinia*-dominated or are composed of *Molinia* mixed with other species such as Bog-myrtle, Gorse and various grasses, as suitable for afforestation. Although there were other safeguards in place, it is considered likely that *Molinia*-dominated/*Calluna*-poor versions of the IVC communities HE2D and HE4A-F, which correspond with 4010, could have been selected for planting under this guidance. A selection of forestry licence appeal cases were analysed by Sargent (2020) with this review highlighting that licences had been granted for

	planting in peatlands, or close to these sensitive areas, during the current reporting period. The 2022 National Survey of Breeding Hen Harrier noted afforestation as one of the main factors responsible for the loss of Hen Harrier foraging and nesting habitats, which include open heather-dominated upland habitats (Ruddock *et al.,* 2024). NPWS staff have highlighted that loss of heath habitat to forestry has likely occurred within the current reporting period (NPWS, pers. comm.). Since 2024, guidance on the 'Land Types for Afforestation' have been revised with stricter criteria in place for planting on peat (DAFM, 2024). This should limit future losses from this activity. PA18 'Agricultural activities generating air pollution' was recorded as a high-importance pressure in NPWS (2019) and was retained as a high-influence pressure this reporting period. Analyses indicate that plant species in the habitats 4010, 7130 and 4060 are the most sensitive to total nitrogen deposition (Aherne *et al.,* 2021). PD01 'Wind, wave and tidal power (including infrastructure)' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure this reporting period. Wind farms can result in direct habitat loss (e.g. turbine foundations, vehicle access roads, sub-stations) and degradation of the surrounding 4010 habitat, largely caused by changes in hydrology and associated ecosystem functioning. Available wind farm data (https://data.gov.ie/dataset/wind-farms-in-ireland) are, in general, provided as a single point for each wind farm development. NPWS (2019) analysis assigned a 2 km buffer to each wind farm point, with this buffer considered representative of the spread of an average upland wind farm development. This 2 km buffer was applied to the wind farm dataset (dated June 2022) with locations of wind farms assessed in relation to the mapped 4010 distribution. A buffer of 1 km was also applied to take account of smaller developments. This review highlighted that 69.3% of all wind farms are within 2 km of 4010 habitat, with 58.8% of wind farms within 1 km. A second analysis was conducted to assess wind farms constructed within this reporting period (2019-2022), 82.9% of new wind farms are within 2 km of 4010 habitat, with 75.6% within 1 km. These analyses indicate that wind farm locations are, and continue to be, strongly associated with the distribution of the 4010 habitat. PM07 'Natural processes without direct or indirect influence from human activities or climate change' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure this reporting period. This impact (i.e. erosion) was recorded within this reporting period by the Suas EIP (2018-2022) and the Blackstairs Farming Futures EIP (2018-2023). Peatlands are prone to erosion where levels of grazing or trampling by sheep are excessive, or where burning has occurred. Wicklow Mountains National Park (NP), for example, has 435 ha of bare peat, as highlighted by intersecting the National Land Cover (NLC) bare peat polygons with the NP boundary. This represents 1.18% of the total area of Wicklow Mountains NP (36,883 ha). Without remedial action, areas of bare peat typically continue to erode due to climatic conditions regardless of removal or control of the causal factors (i.e. excessive grazing and burning).

	Low-influence pressures featuring in NPWS (2019) that were recorded as 4010 pressures during the current reporting period comprise: PF05 'Sports, tourism and leisure activities' (e.g. all-terrain vehicle use, walking), PI02 'Other invasive alien species (other than species of Union concern)', PE01 'Roads, paths, railroads and related infrastructure', PC05 'Peat extraction', PI03 'Problematic native species', PL02 'Drainage', PA25 'Agriculture activities not referred to above (e.g. agricultural intensification–removal of semi-natural vegetation, reseeding and fertilisation for pasture)' and PM05 'Avalanches, landslides and collapse of terrain'. These were retained as low-influence pressures this reporting period. Low-influence pressures only recorded in the current reporting period comprise: PA10 'Livestock farming (without grazing)' (i.e. supplementary feeding) and PB24 'Drainage for forestry' (i.e. firebreaks). Low-influence pressures only recorded in NPWS (2019) comprise: PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)', PK05 'Mixed source soil pollution and solid waste (excluding discharges)', PL05 'Modification of hydrological flow' and PK03 'Mixed source air pollution, air-borne pollutants'. These were retained as low-influence pressures this reporting period. Climate change (mainly as PJ01 'Temperature changes and extremes due to climate change' and PJ03 ' Changes in precipitation regimes due to climate change') is assessed as a low-influence pressure but is considered to be a medium-importance threat to 4010. Renou-Wilson & Wilson (2018) indicate areas will be impacted by climate-induced disturbances, "including (1) gradual changes (in temperature; in the amount, intensity and seasonal distribution of precipitation) and (2) extreme events (severe drought; increased wildfires; flooding events)". Areas in unfavourable condition will be more susceptible to the impacts of climate change. Concerns relating to prospective seasonal changes include increases in winter rainfall leading to enhanced erosion. An increased risk of severe fire events is likely in areas where drought periods increase as a result of climate change. Intense fires can burn away the shallow peat soil or expose it to erosive elements such as extreme rainfall events. Invasive non-native species may also pose a greater risk to 4010 habitat if their growth conditions are more favoured by changes in climate (e.g. *Rhododendron ponticum, Picea sitchensis, Pinus contorta*). Intense summer heats causing desiccation and cracking of the surface peat, followed by subsequent intense rainfall events may be expected to increase the risk of peat landslides (Dykes, 2008, 2022). The six high and medium-influence pressures reported in section 7.1 are also considered to be the main threats to the 4010 habitat in the future, along with climate change.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MA14 Other measures related to agricultural practices MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) MC02 Adapt/manage exploitation of energy resources MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MK01 Reduce impact of mixed source pollution MK03 Restoration of habitats impacted by multi-purpose hydrological changes MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Conservation measures were selected using data gathered from the NSUH (Rigoni *et al*. 2023; Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), NPWS, INTERREG VA projects, LIFE IP projects, EIP-AGRI projects, EU Horizon 2020 projects, Department of Agriculture, Food and the Marine (DAFM) and Coillte. The most widely applied measures comprise those related to agricultural practices (MA). During the current reporting period, the LIFE IP Wild Atlantic Nature (WAN) and numerous European Innovation Partnerships (EIPs) have built capacity for the CAP Strategic Plan 2023, and the learnings from these projects informed the development of Irelands new national Agri-environmental scheme (i.e. ACRES, 2023-ongoing). Further details on each of these projects are provided below.

	As outlined in section 8.2, it is estimated the scope of measures taken impacted less than 50% of the 4010 habitat this reporting period. Participation in Agri-environmental schemes does not guarantee positive management measures will be undertaken. However, the adoption of results-based scoring in agricultural schemes, with habitat condition linked to payment, provides incentives to landowners to improve habitat condition. Conservation projects operating within blanket bogs were considered here as heathland typically forms an intimate mosaic with blanket bogs in the uplands. Only projects that have had a demonstrable impact on the 4010 habitat or were likely to have had a positive impact on the habitat, are mentioned below. The maintenance of extensive grazing (recorded under MA03) was recorded as a conservation measure four times by the NSUH as either a neutral or positive impact on 4010 habitat. Two INTERREG VA projects, Cooperation Across Borders for Biodiversity (CABB) and Collaborative Action for the Natura Network (CANN), conducted this reporting period, were directly connected to the protection and restoration of Natura 2000 sites. As part of CABB (2017-2022), a network of old forestry drains were blocked at Fiddandarry Bog within Ox Mountains Bog SAC (002006) (MB14). This restored and rewet approximately 450 ha. The 4010 habitat occupies 15% of the Fiddandarry Bog study area. Fencing and a sustainable grazing management plan were instigated on state-owned land at Dunragh Loughs/Pettigo Plateau SAC (001125) (MA04, MA05). As part of CANN (2017-2022), restoration actions in Cuilcagh-Anierin Uplands SAC (000584) included drain blocking (MK03), restoring eroded peat using natural materials such as coir rolls and heather brash (MM01), invasive species control (MI03), the development of wildfire management plans (MA05) and track development to reduce impacts on sensitive habitats (MF03). Actions at Sliabh Beagh/Eshbrack Bog NHA included drain blocking (MK03), invasive species control (MI03), wildfire management plans (MA05) and conservation grazing using Dexter cattle (MA04). LIFE IP Wild Atlantic Nature (WAN) is a nine-year environmental project (2021-2029) that aims to improve Ireland's performance in conserving habitats, and in particular to improve the conservation status of blanket bog SACs. Though the focus is on blanket bogs it is anticipated this project will also result in an improvement in the condition of 4010 habitat within the project area. Within the WAN project area, there are 35 blanket bog SACs (of which 24 are conservation action sites) with a total area of 262,632 ha. WAN project activities include: habitat mapping, land and ecosystem management, capacity building and education/awareness. Central to the project was a pilot Results-Based Payment Scheme (RBPS) conducted 2021/22. Over 820 farmers across 63,000 ha of Natura 2000 and neighbouring lands participated in the pilot (MA04, MA05). Additional supporting actions in the scheme included: fencing (MA05), invasive species control (MI03), peatland restoration and drain blocking (MA13, MK03, MC07). This RBPS built capacity for the CAP

	Strategic Plan 2023, and the learnings from the pilot informed the development of the Agri-Climate Rural Environment Scheme Co-operation Project (ACRES CP). LIFE IP WAN also coordinates a €15 m Shared Island Initiative project aimed at developing capacity, expertise and sharing knowledge, and delivering peatland restoration. It is a collaboration of NPWS, Northern Ireland Environment Agency (NIEA) and NatureScot. WAN facilitates training to a wide range of peatland stakeholders. They are involved in demonstrating the restoration of eroded and drained peatlands (MM01, MK03) in Co. Leitrim, and demonstrating forest to bog restoration (MB14) on private lands in Co. Mayo and within Wild Nephin National Park (WAN, 2024). LIFE IP WAN are also developing a retrofitting and restoration pilot to help address turf-cutting in SACs by providing homeowners with alternative energy sources. This pilot is looking to demonstrate the deep retrofitting of homes as a way to reduce demand for turf. Simultaneously, participants will agree to restore turbary in SACs (MC02) and agree to manage peatland habitats on their farms in a sustainable manner (WAN, 2024). WaterLANDS (2021-2026) is funded through the EU Horizon 2020. The Irish action site, which is coordinated by LIFE IP WAN, is located in Cuilcagh-Anierin Uplands SAC (000584). WaterLANDS aims to restore over 500 ha of blanket bog habitat between September 2024-March 2025, with 4010 habitat likely to be positively impacted. Actions include: invasive conifer control (MI03), implementing measures to control erosion (MM01), reprofiling turf banks, and improving water levels (MK03) (WAN, 2024). The Dúlra Project is primarily involved in the control of the invasive Rhododendron (MI03) in parts of the Twelve Bens/Garraun Complex SAC (002031), the Connemara Bog Complex SAC (002034) and the Mweelrea/Sheeffry/Erriff Complex SAC (001932). The project is a collaboration between FORUM Connemara's Agri-EIP, the North Connemara Locally Led Agri-Environmental Scheme and the Leenane Development Association. Funding is provided by the NPWS via the LIFE IP WAN (https://www.dulraproject.com/). Agri-Climate Rural Environment Scheme (ACRES) is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high priority geographical areas are included under ACRES Co-operation (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. The peatland scorecard is the dominant scorecard used for ACRES CP. It is used on 166,541 ha of private land and 394,836 ha of commonage (Muldowney, 2024). Each peatland scorecard has environmental indicators relating to ecological integrity (e.g. number of positive indicators, cover of bryophytes and lichens, grazing levels etc.), hydrological integrity, and threats and future prospects (e.g. erosion, bare peat, non-native plants, bracken, etc.). Farmers can increase their payments by adjusting management

	practices (MA04, MA05) and/or undertaking Non-Productive Investments (NPIs) or Landscape Actions (LAs). Undertaking NPIs and LAs can increase payment up to €17,500 over the five years of the contract. NPIs differ from Landscape Actions (LAs) in that they are generally smaller in scale (e.g. wildlife boxes, bracken control (MI05), tree planting, fencing (MA05), installing gates, scrub removal (MI05)). Rollout of LAs will take place in Q2-Q3 2025. The provisional list of proposed LAs includes a number of landscape actions that could assist in restoring degraded peatlands. These include: invasive species control, virtual fencing, targeted grazing by bovines/goats/equines, ditch/peat reprofiling, erosion control (e.g. using geotextiles) and drain blocking with peat plug/timber dam/coir rolls. The uptake of these LAs and their scale of impact will not be known until the next reporting period. Analyses of the initial ACRES data are underway to determine the impacts of the scheme, although quantifiable improvements are likely to take a number of years. Low-emission slurry spreading reduces nitrogen losses to the air and subsequent nitrogen deposition in sensitive habitats. There is currently a Low Emission Slurry Spreading (LESS) Equipment Scheme available to farmers to assist them to buy new slurry-spreading equipment. ACRES also promotes the practice of low-emission slurry spreading amongst participating farmers by issuing a payment to farmers for adopting the measure (MA14, MK01). A number of locally led European Innovation Partnerships (EIPs) with an upland focus were in operation this reporting period. Ecologically sustainable grazing was typically a cross-cutting deliverable, with many of these schemes embracing results-based scoring. Education, awareness-raising and supporting hill farmers were also key features of these schemes. Relevant EIPs comprise: - Blackstairs Farming Futures (BFF) Sustainable farming project in the Blackstairs Mountains (2018-2023). Main actions: sustainable grazing by sheep and cattle (MA04, MA05), bracken control (MI05), scrub control (MI05), invasive species control (MI03) and fencing (MA05). Eight of the nine commonages improved their score during the project. The project helped to encourage the continued conservation management of heath habitats and a moratorium on burning reduced the number of farmer-lit fires (MA06). - The Sustainable Uplands Agri-environment Scheme (SUAS) (2018-2022) was initiated by the Wicklow Uplands Council. Actions: controlled grazing (MA05), controlled burning (MA05), bracken control (MI05), invasive species control (MI03), heather and gorse mulching (MA04, MI05) and gully blocking (MM01). - A Sustainable Agricultural Plan for the MacGillycuddy Reeks - Conservation and restoration of Upland Habitat in the MacGillycuddy Reeks (2018-2021). Actions: sustainable grazing by cattle and sheep (MA04, MA05), invasive species control (MI03), heather thinning (MA04), fencing to exclude grazers (MA06), cessation of burning (MA06), management of recreational impacts (MF03) and trail maintenance (ME01). Fourteen land parcels saw improvement in their baseline score, five land parcels remained unchanged, and one land parcel declined by five points.

	The project report notes "whether it is controlled grazing with sheep and cattle, or the treatment of invasive species such as bracken and rhododendron, several years are required to see measurable changes on the ground". - Locally Led Scheme for the Conservation of the Hen Harrier (2017-2023). This EIP targeted lands in six Special Protection Areas (SPAs) designated for breeding Hen Harrier. Actions: conservation grazing with cattle (MA04), controlled grazing (MA05), drain blocking (MA13), invasive species control (MI03), controlled burning – under special circumstances (MA05) and fencing (MA05). - Inishowen Upland Farmers Project (2019-2023) operated on the Inishowen peninsula, Co. Donegal. Actions: Conservation grazing using cattle (MA04). - Pearl Mussel Project - Farming for nature in a vibrant rural economy (2018-2023). This project focused on the top eight Freshwater Pearl Mussel catchments. Actions: sustainable grazing (MA04, MA05), invasive species control (MI03), drain blocking (MA13, MK03) and fencing (MA05). - North Connemara Locally Led Agri-environmental Scheme (2019-2023) operated within the Maumturks and Twelve Bens/Garraun mountain ranges. Actions: fencing (MA05) and invasive species control (MI03). - Comeragh Uplands and Communities EIP Project (2021-2022) operated in the Comeragh Mountains, Co. Waterford. Actions: prescribed burning training (MA05). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) EFFIS annual reports noted that several landowners had financial penalties imposed under farm payment schemes by DAFM this reporting period, particularly where burning was found to occur outside of the legally permitted period. There were also incidences where farmers were penalised when fires were permitted to burn overnight from February 28th into the illegal period commencing March 1st (MA06). Within Ireland's National Parks (NPs), Wicklow Mountains NP is undertaking peatland restoration trials. At Barnacullian, NPWS staff commenced restoration in 2022. Actions within 4010 habitat at this restoration site comprise: fencing (MA05) and heather cutting to restore structure (MA04). Wicklow Mountains NP staff also control the invasives *Rhododendron* and Sika Deer (MI03). Glenveagh NP controls Red Deer numbers (MI05) and controls *Rhododendron* and Prickly Heath (MI03). Connemara NP undertakes *Rhododendron* control (MI03). The NP has acquired a small herd of Irish Moiled cattle they intend to use for conservation grazing (MA04). The Mweelin Sheep Exclosure Project (MA06) was initiated to allow a 24 ha of the NP to recover from unsustainable grazing. The NP website states that "this work may demonstrate the need for this management method across the whole National Park".

	Killarney NP undertakes *Rhododendron* control (MI03) and deer management (MI03 (Sika Deer) and MI05 (Red Deer)). Páirc Náisiúnta na Mara, Ciarraí, Ireland's newest National Park, incorporates Mount Brandon Nature Reserve, which has ongoing conservation grazing using cattle within 4010 habitat (MA04). Staff in the National Parks are also typically involved in maintenance of tracks and trails to prevent damage to sensitive habitats (ME01, MF03), work to reduce incidences of illegal dumping (MK01) and illegal fire activity (MA05) and enforce the Ministerial Direction 2010 on the use of All Terrain and Off-Road Vehicles (MF03). The NPWS Farm Plan Scheme protects key species and habitats through the delivery of site-specific conservation measures at farm level. Polygons containing wet heath (HH3) were extracted from the NPWS Farm Plan shapefile (NPWS_FarmPlans_2019_2023.shp). Measures recorded in these polygons included: controlled grazing (MA05, *n*=65 polygons), fencing (MA05, *n*=17), conservation grazing with non-native breeds (MA04, *n*=17), scrub control (MI05, *n*=13), invasive species control (MI03, *n*=9), conservation grazing with rare native breeds (MA04, *n*=2) and grazing cessation (MA06, *n*=2). The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Microsoft Excel spreadsheet was reviewed for measures associated with the 4010 habitat. Measures listed include: invasive species control (MI04, *n*=17 records), vegetation management such as heather cutting (MM01, *n*=4), stopping fires and trespassing sheep (MA06, *n*=3), 9km of drain blocking (MA13, *n*=3), fencing and targeted grazing (MA05, *n*=2), Red Deer control (MI05, *n*=2), conservation grazing (MA04, *n*=1) and access track upgrades (MF03, *n*=1). The extent of 4010 habitat impacted by the CMP is unknown as exact areas were not provided. NPWS also runs the Peatlands and Natura Community Engagement Scheme (2018-ongoing), this scheme encourages local initiatives that enhance awareness and conservation of raised and blanket bogs. Coillte are currently increasing the area of their estate managed primarily for nature, from 20% to 30% by 2025. Any remaining open habitat (e.g. heath/bog) not currently in an existing Coillte 'Biodiversity Area' will be identified by this project and a set of provisional management prescriptions drawn up (e.g. invasive species control, drain blocking). Poorly developed conifer plantations on peat are also being targeted by this project, with the view to restore these areas to open habitat (MB14). Since 2024, DAFM require all afforestation to be carbon neutral or carbon positive. Afforestation is now only permitted on peat soils with a depth of 30 cm or less. This replaces the former allowance (pre-2024) for afforestation on peat with a depth of 50 cm or less. A new spatial layer is available on INET/IFORIS, with this layer being a composite of the Derived Peatland map V2, National Landcover map and Irish Soils Database. It will be assumed for the purpose of afforestation applications that peat soils within these areas are as categorised, unless proven otherwise (MB01). (Accessed from: https://assets.gov.ie/268255/3df078e5-131e-4434-88ee-8a8361ce3330.pdf.) This measure is likely to result in a reduction of

	4010 habitat impacted through afforestation but will not preclude this from occurring. The Irish NGO, Friends of the Irish Environment (FIE) challenged the 30 cm allowance, highlighting that the new guidance failed to take on board the United Nations 2022 advice to protect all peat soils deeper than 10 cm (FIE, 2023).

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current Range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in Range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current area less than the Favourable Reference Area (<10% below FRA). Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative*, as PD01, PB01 and PM07, in combination with several low influence pressures (e.g. PA25, PI02, PM05, PC05) are expected to have a negative influence on area, especially for areas of 4010 habitat outside of Natura sites, even with the conservation measures MB01, MC07, MM01 and MB14 in place. Future prospects of Area are therefore *Poor*. Short-term trend direction is stable for habitat that is in good condition. Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A minimum estimate of 59.2% of 4010 habitat is in not-good condition, which equates to *Unfavourable-Bad* Structure and functions. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. Future trend of Structure and functions is assessed as *stable* as, although PA07, PA09 and PM07 are expected to have a negative influence on Structure and functions, their presence is not expected to change the overall status of Structure and functions within the next 12 years. Where the conservation measures MA04, MA05 and MA06 occur they would be expected to balance the threats, however it should be noted that these are not implemented across the national distribution of the habitat nor are they specifically targeted measures for the 4010 habitat. Future prospects of Structure and functions are therefore *Bad*.	

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*

Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
a) No, there is no difference	***a) No, there is no difference***
b) yes, due to genuine change	*b) yes, due to genuine change*
c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
d) yes, due to the use of different method	*d) yes, due to the use of different method*
e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
f) yes, due to other reasons	*f) yes, due to other reasons*

10.8 Additional information

Optional

The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area is *Unfavourable-Inadequate* in this reporting period, as it was in the previous reporting period.

The Conservation Status of the Structure and functions and Future prospects are *Unfavourable-Bad* in this reporting period, as they were in the previous reporting period.

The Overall Conservation Status was assessed as *Unfavourable-Bad*, as it was during the last reporting period. The status of *Unfavourable-Bad* during the current reporting period was due to less than 25% of the area of 4010 habitat being assessed as having favourable Structure and functions.

Trend in Overall Conservation Status was assessed as *deteriorating* this reporting period, as it was in the previous reporting period. The deteriorating trend is largely due to area losses within the current and previous reporting period. This has resulted in a *decreasing* short-term

	trend for Area. Short-term trends for Range and Structure and functions are *stable*.

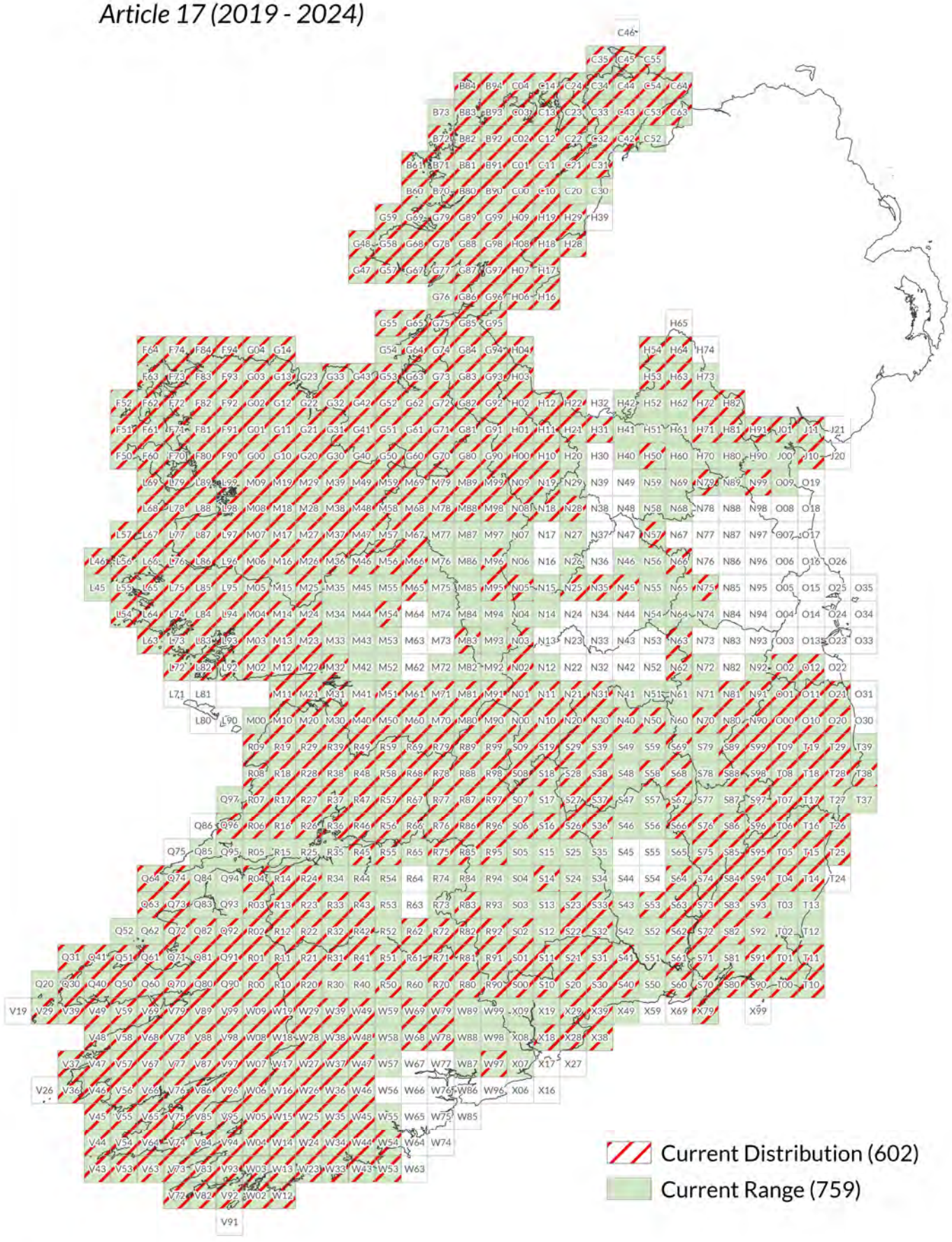
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1,106.48 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the SAC network was estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile.	

	The area given in section 11.1 is the total area of 4010 habitat in SACs in the country (38.1% of total national area), including SACs where 4010 is not listed as a qualifying interest (QI). The area of 4010 within the SAC network where 4010 is listed as a QI is 875.57 km^2. The surface area of 4010 habitat within the SAC network has increased since the last reporting period as a result of improved knowledge lending itself to a refinement of area totals. The short-term trend of the 4010 habitat area within the SAC network is taken to be *decreasing*, the same trend as the 4010 habitat nationally (section 5.7). Using the GSI (2024) landslide extent dataset, approximately 2.5 ha was lost through landslides within SACs this reporting period. The short-term trend of the 4010 habitat in good condition within the SAC network is assumed to be *stable*, the same trend as the 4010 habitat nationally (section 6.4).

12 Complementary information *N/A*

Wet heaths (4010)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**4030 European dry heaths**
1.2i Habitat short name	**Dry heaths**
1.3i Habitat description	In Ireland, 4030 European dry heath comprises vegetation dominated by ericaceous dwarf shrubs typically occurring on well-drained, nutrient-poor, acidic, mineral soils or on shallow peats and peaty podzols. *Calluna vulgaris* is generally the main species but *Erica cinerea, Ulex gallii* and *Vaccinium myrtillus* may also be important components. Dry heaths occur from sea level up to around 400 m, where they may transition to 4060 Alpine and Boreal heaths. Calcareous dry heaths, where dwarf shrub communities have developed on leached soils over a base-rich substrate (e.g. in the Burren), are included in 4030 habitat and may contain several species of calcareous grassland. Stands of *Ulex europaeus* are classed as scrub habitat and are thus not included in 4030 habitat. Dry heath has affinities to Braun-Blanquet phytosociological associations *Ericion cinereae, Daboecion cantabricae, Ulicion, Kobresio-Dryadion* and *Calluno-Genistion pilosae* (Perrin, 2024). Within the Irish Vegetation Classification (IVC) system (Perrin, 2024), most examples of the *Calluna vulgaris – Hypnum jutlandicum* heath community (HE2B) occur in 4030 habitat, and elements of other communities within the *Dryas octopetala – Sesleria caerulea* (HE1), *Erica cinerea – Calluna vulgaris* (HE2) and *Vaccinium myrtillus – Racomitrium lanuginosum* (HE3) heath groups, can also occur.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1949-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4030 or Fossitt codes HH1 or HH2 (Fossitt, 2000), a relevant NPWS or Irish Vegetation Classification (IVC) habitat code or the National Land Cover (NLC) class 'Dry heath'.

	Sources added to the distribution map this reporting period are: five National Survey of Upland Habitats (NSUH) sites (Rigoni *et al.* 2023; Barron et *al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), Barron & Mackin (2022), Crowley *et al.* (2023), Foss *et al.* (2021), Hodd (2023), Martin *et al.* (in prep.), Scott Cawley (2021), Lydon & Smith (2023), Smith & Crowley (2020), Parr & Jeuken (2021), the National Fen Survey 2021 to 2023 dataset (Brophy *et al*., in prep.) NPWS Farm Plans (2019-2023) and the BirdWatch Ireland EU INTERREG CABB habitat surveys. In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: 15 NSUH sites (Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012), Barron & Daly (2015a, 2015b), Coillte Biodiversity Dataset (various dates), Curtis & Wilson (2014), Daly & Barron (2014, 2015), Foss *et al.* (2012, 2014, 2015), Galway County Council (2017), Hodd (2012, 2015a, 2015b, 2016), Martin *et al*. (2018), O'Neill & Martin (2018), O'Neill *et al.* (2013a, 2013b), Perrin (2024) which comprises data ranging from 1949 to 2011, Tubridy *et al.* (2015), Wilson & Duff (2014), Anon. (1998, 2005, 2007, 2010), Barron & Perrin (2010, 2011), Burren and Glenveagh National Park Habitat Maps, Cooper *et al.* (2012), Crushell & O'Callaghan (2008), Foss & Crushell (2012), Hickey & Tubridy (2009), Murphy & Fernandez (2009), NPWS (2013a), NPWS Habitat Assignment Project, O'Donoghue *et al*. (2008, 2011), Wilson (2009) and Wilson & Foss (2011). GIS files from the Carlow Pilot Habitat Mapping Project (Carlow County Council), the Cavan Wetlands Survey (Cavan County Council), Dún Laoghaire-Rathdown habitat survey (Dún Laoghaire-Rathdown County Council), Fingal Local Area Surveys (Fingal County Council), Lough Derg Habitat Survey (Clare County Council), N18 EIS (Galway County Council), South Clare Habitat Map Cratloe to Parteen (Clare County Council) and Uplands and Peatlands Grazing Survey (NPWS) were also utilised. All references are detailed below in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. Certainty values from the datasets utilised during the last reporting period were not reassigned for the purposes of the distribution map. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron S.J. & Mackin F. (2022) Fiddandarry Bog, Co. Sligo Monitoring Report. Unpublished report for Birdwatch Ireland by BEC consultants and RPS Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. BirdWatch Ireland CABB surveys (2019-2020) GIS files for this INTERREG VA project were made by BirdWatch Ireland & NPWS. Brophy *et al.* (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Crowley, W., Vanmechelen, A., O'Sullivan, J. Crushell, P. & Foss, P. (2023) County Mayo Wetlands Field Survey II 2023. Report prepared for Mayo County Council. Foss, P., Gallagher, M.C., Kirwan, B. & Crushell, P. (2021) County Kilkenny Wetlands Field Survey 2021. Report prepared for Kilkenny County Council. Hodd, R. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Report for Hometree, Ennistymon, Co. Clare. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland.

Lydon, K. & Smith, G. (2023) National Land Cover Map of Ireland 2018, Final Report. Report for Ordnance Survey Ireland, Phoenix Park, Dublin 8, D08 F6E4.

Martin, J.R., O'Neill, F.H., Daly, O.H. & Woods, K.M.S. (in prep.) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats 2021-2023. *Irish Wildlife Manuals*, No. 1XX. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

NPWS Farm Plans (2019-2023). GIS files for the NPWS Farm Plans were made available by NPWS.

Parr, S. & Jeuken, N. (2021) Linking Burren data project. Unpublished report for NPWS.

Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Site Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland.

Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG.

Smith, G.F. & Crowley, W. (2020) The habitats of cutover raised bog. *Irish Wildlife Manuals*, No. 128. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Datasets included in NPWS (2019) and retained for the distribution maps this reporting period:

Anon. (1998) Manual for the preparation of Commonage Framework Plans. National Parks and Wildlife Service and Department of Forestry and Food. Ireland.

Anon. (2005) Galway City Habitat Inventory. Unpublished report by Natura Environmental Consultants for Galway City Council.

Anon. (2007) Survey and mapping of habitats in the Carrigaline Electoral Area. Unpublished report by Compass Informatics for Cork County Council.

Anon. (2010) Pilot ecological study of two Donegal Islands: Inishfree Upper and Inishmeane. Unpublished report for Donegal County Council by Aulia Wann & Associates and Gaia Associates.

Barron S.J. & Daly O.H. (2015b) Phase 1 of the scientific work to inform a system for the management of turf-cutting in designated blanket bog SACs and NHAs: Phase 1 Over-arching report – DRAFT. Unpublished draft report to National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***78,700 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	

4.6 Short-term trend **Magnitude** **Type of estimate** *Optional*		
4.7 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend **Period** *Optional*	***2000-2024***	
4.9 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 78,700 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ approximately equal to the favourable reference range (less than 2% smaller) ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	

4.13 Range when Directive came into force *Optional*	There is no evidence of loss of Range since the Directive came into force.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 4030 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Short-term trend for Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). There was no loss of range caused by the recorded losses of area during these two reporting periods. The short-term trend in Range is judged to be *stable*. Due to improved knowledge from additional survey sources in the current reporting period, there is a 121 10x10 km grid cell increase between the last reporting period (666 cells) and the current reporting period (787 cells). These changes are primarily due to the inclusion of the National Land Cover (NLC) dry heath polygons (Lydon & Smith, 2023) this reporting period. Refinement of data this reporting period resulted in the removal of ten 10x10 km grid cells from the mapped 4030 distribution compared to NPWS (2019). The removed cells were previously included based on data from: Moran & Wilson-Parr (2015) (H53, H64, R03, R14, R31, R32), NPWS Habitat Assignment Project (B60, X07, X16) and Barron & Perrin (2010) (M03). During the current reporting period, these polygons/points were superseded by NLC data (Lydon & Smith, 2023), with the latter dataset indicating there was no dry heath in these cells. The removal of these 10x10 km grid cells represents dataset refinement rather than genuine losses. The Favourable Reference Range (FRR) is based on the premise used in NPWS (2007) that the current estimate of range is the FRR, as there has been no decline since the Directive came into force in 1994, and no enlargement of range is deemed necessary to ensure the long-term survival of the habitat. The FRR is the current range, reported in section 4.1. The FRR has increased since the last reporting period (NPWS, 2019), reflecting the improved level of habitat mapping rather than habitat expansion.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1949-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2,166.48 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	

5.4 Surface area **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend **Period**	***2013-2024***	
5.7 Short-term trend **Direction**	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend **Magnitude** *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend **Magnitude** **Type of estimate**	*Best estimate / multi-year mean / 95% confidence interval / minimum/****pre-defined range***	

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	Unknown
5.17 Additional information *Optional*	The period for which the surface area of dry heath was determined begins in 1949 when bog and heath relevés were recorded by Braun-Blanquet and Tüxen (see Perrin, 2024) and incorporates updates from surveys up to 2023. See a full list of these resources in section 3.4. Area was calculated from the polygon shapefile and point shapefile used for distribution. Each point record located more than 50 m from a habitat polygon had 10 ha of dry heath applied. This is a conservative estimate, since 4030 can cover substantial areas. The reported surface area of 4030 has increased from 1,230.01 km² in NPWS (2019) to 2,166.48 km² this reporting period, largely due to the inclusion of the National Land Cover (NLC) dry heath polygons (Lydon & Smith, 2023). Section 5.3 was amended from 'minimum' in NPWS (2019) to 'best estimate' this reporting period. This change is due to the inclusion of the NLC dry heath polygons (Lydon & Smith, 2023). NLC polygons were derived from remote sensing and machine learning. The NLC accuracy in identifying dry heath is 70% according to the F1 Score (%) in Lydon & Smith (2023). It is important to note, however, that this accuracy level is based on aerial photograph interpretation, not field verification. Despite these reservations, the distribution map now has national coverage for this habitat. Area loss has not been determined through systematic review as there is no monitoring network for the habitat. The current area loss assessment uses data from the National Survey of Upland Habitats (NSUH), NPWS (2019), as well as wind farm and landslide datasets. Of the datasets used to map the 4030 distributions, loss of area was only fully assessed during NSUH surveys. Twenty-one NSUH datasets were used in the Area assessment (Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b; Rigoni *et al*. 2023, Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012). These 21 datasets represent 6.2% of the total area of 4030 habitat. All but one of these 21 NSUH sites are within SACs. Therefore, losses within these sites are not fully representative of the losses occurring outside the SAC network, where losses would be expected to be larger. To estimate other losses, particularly those occurring outside the SAC network, two other national datasets on wind farms and landslides were used. The methodology used to determine losses using these datasets is presented below. The default trend periods used are those presented in section 5.6 and 5.11. A wind farm point location shapefile from SEAI's Wind Atlas dated June 2022 was sourced (https://data.gov.ie/dataset/wind-farms-in-ireland). This dataset was used to estimate 4030 area loss by comparing the locations of wind farms to the 4030 polygon and point distribution shapefiles. Wind farm points that overlapped or were within 50 m of a mapped 4030 feature had an estimated area loss of 1 ha applied. The 'Year of Construction' field in the wind farm dataset

	was used to determine the time period the loss occurred. This analysis derived a conservative estimate of 10 ha of 4030 habitat loss from wind farms developments since 2013 (60% of the loss occurred this reporting period), and 28 ha of loss from wind farms developments since 2000. These figures are considered minimum losses from this activity. A Geological Survey Ireland (GSI) landslide extent dataset was sourced (GSI, 2024). This dataset mapped boundaries of recorded landslides. It was intersected with the 4030 polygon and point distribution shapefiles to determine the area of potential loss. The 'Year' field in the landslide dataset was used to determine the timing of the event. This analysis indicated 3.7 ha of potential loss from landslides since 2013 (33.6% of the loss occurred this reporting period), and 6.6 ha of potential loss since 2000. While not all landslide events will result in permanent loss of the 4030 habitat (especially if residual peat remains), some events will leave only the subsoil or rocky substrate, rendering it unsuitable for recolonisation. A further 344.8 ha of landslide events intersected the 4030 dataset. These data could not be used, as no 'Year' was assigned to the event. Considering the unassigned 344.8 ha of landslides within 4030 (some of which may represent permanent loss within the relevant time periods), the 3.7 ha and 6.6 ha of potential loss derived from the above analyses were considered actual loss for the purpose of determining trend. These figures are considered minimum losses from this activity. Short-term trend direction for Area was determined to be *decreasing*. Since 2013, approximately 0.44 ha of 4030 habitat were determined to have been lost from two out of seven NSUH sites surveyed (Ballyhoura Mountains SAC (002036) and Slieve Bloom Mountains SAC (000412)). Activities these losses were attributed to are: afforestation and recreational activity causing erosion (Barron *et al.* 2022a; Rigoni *et al.* 2023). In addition, spatial analyses assigned 10 ha of loss to wind farms since 2013, and 3.7 ha of loss to landslides since 2013. During the previous reporting period, NPWS (2019) reported 1 ha of 4030 loss due to excavation and land reclamation between 2012 and 2014 at Ardaun, Co. Galway. The total derived estimate of 4030 habitat lost since 2013 is 15.14 ha. The NSUH datasets indicated habitat gains since 2000 at four of the 21 NSUH sites due to succession (1.8 ha) but no gains within the current or previous reporting period. The magnitude of known loss was calculated as 0.0006% per annum measured over a period of 12 years. Although the magnitude of known loss is less than 1% per annum, actual losses of 4030 are likely to be significantly higher. Long-term trend direction for Area was determined to be *decreasing*. Since 2000, approximately 10.63 ha of 4030 habitat within 14 of the 21 NSUH sites have been lost. This indicates that losses in area are occurring across the geographic spread of 4030 habitat. Activities responsible for losses at NSUH sites since 2000 are: paths and tracks, afforestation, peat extraction, landslides, mining/quarrying, erosion, roads, off-road driving, buildings, car parks, agricultural intensification and fire activity. Spatial analyses of 4030 habitat losses since 2000

	assigned 28 ha of loss to wind farms, and 6.6 ha of loss to landslides. Along with the 1 ha lost at Ardaun, Co. Galway (between 2012-2014), the total derived estimate of 4030 loss since 2000 is 45.23 ha. There are no readily available national data on land-use change from 4030 habitat to forestry. The Department of Agriculture, Food and the Marine (DAFM) indicated that afforestation of unenclosed land (predominantly made up of peat type soils) peaked in 1995 with over 6,000 ha planted per annum, but since 2006 there has been a steep decline with 265 ha of unenclosed land planted in 2011, and approximately 100 ha of unenclosed land planted in 2013 (NPWS, 2015; Renou-Wilson & Byrne, 2015). However, 4030 habitat can also occur on enclosed lands. Farrell & Renou-Wilson (2008) reported that, in 2006, a total of 8,012 ha of new plantations were established nationally; 2,323 ha (29%) of this were on peat soils, mainly on blanket peatland. Data released under Access to Information on the Environment (AIE) indicated that in 2015, approximately 5,300 ha of forestry were approved for planting on peat soils (Sargent, 2020). However, the latter figure cannot reliably be used to determine area loss of heath/bog due to afforestation, since extensive areas of peat soils (c. 339,300 ha) are also under grassland (Duffy *et al.* 2023). There is a drive by DAFM to increase Ireland's annual rates of afforestation which could increase pressure on 4030 habitat outside of protected sites. Atypical examples of dry heath are at greatest risk of afforestation (e.g. grassy examples and/or severely overgrazed sites), as such sites may not be readily identifiable as heath by non-specialists. Favourable Reference Area is deemed to be greater than the current area, but less than 10% more, given that anthropogenic losses have occurred since the Directive came into force. Based on the suite of 21 NSUH sites surveyed to date, there has been an estimated loss of 17.99 ha of 4030 habitat since 1995. Twenty of the NSUH sites are within SACs. The Sustainable Uplands Agri-environment Scheme (SUAS) EIP project (2018-2022) assessed area loss of 4030 habitat within participating commonages in the Wicklow/Dublin uplands from the 1990s onwards. While exact areas (ha) were not reported, the activities causing 4030 habitat loss since the Directive came into force included: overgrazing, burning, landslides and recreational activity causing erosion. However, whether the impacts from these pressures cause area losses or affect the condition of the habitat has not been fully assessed. All but two of the participating commonages with reported 4030 habitat loss were in Wicklow Mountains SAC (004040). Area losses of 4030 habitat outside of SACs are likely to be higher due to lower levels of protection and scrutiny, however no systematic national review of losses of 4030 has been conducted. Analysis of the 4030 mapped distribution and the SAC shapefile (SAC_2024_05_Matrix.shp) indicates 50.0% of 4030 habitat lies outside of the SAC network.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***559.09 km²***
		Maximum	***966.25 km²***
	b) Area in not-good condition	**Minimum**	***1,200.23 km²***
		Maximum	***1,607.39 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***		
6.7 Typical species Method used *Optional*	Typical species for 4030 habitat are: *Arctostaphylos uva-ursi, Calluna vulgaris, Daboecia cantabrica, Empetrum nigrum, Erica cinerea, Ulex gallii, Vaccinium myrtillus* and *Vaccinium vitis-idaea.*		
6.8 Additional information *Optional*	Perrin *et al.* (2014c) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. There is no national monitoring network for the 4030 habitat, though monitoring stop data for the current reporting period was available from a limited number of sites from the NSUH, the SUAS EIP and LIFE IP Wild Atlantic Nature (WAN). A total of 27 monitoring stops were recorded in 4030 habitat across four NSUH sites within this reporting period. Of the 27 stops, 16 (59.3%) failed one or more of the criteria assessing the vegetation		

	composition, vegetation structure and physical structure of the habitat. Data for 63 monitoring stops recorded in 4030 habitat as part of the SUAS EIP (2018-2022) in the Wicklow/Dublin uplands were collated. Of the 63 stops, 48 (76.2%) failed one or more of the criteria. Data from one LIFE IP WAN project site was made available for the current assessment. Surveys of Owenduff/Nephin Complex SAC (000534) were conducted in 2023/24 with 34 stops in 4030 habitat. Of the 34 stops, 28 (82.4%) failed one or more of the assessment criteria. Combining the data from the NSUH, SUAS EIP and LIFE IP WAN gives a total of 124 monitoring stops. Of these 124 stops, 32 passed (25.8%) the Structure and functions assessment and 92 failed (74.2%). When these percentages are scaled up to the national area of 4030 habitat (2,166.5 km²), 559.09 km^2 is good condition and 1,607.39 km^2 is in unfavourable ('not-good') condition. As these data are based on a limited dataset with a poor national distribution and sample size, data from the last reporting period were also utilised. During the previous reporting period, 44.6% of the 4030 habitat was deemed to be in good condition and 55.4% in not-good condition (NPWS, 2019). These same percentages were applied to the current area of 4030 habitat to derive the maximum area in good condition (966.25 km²) and minimum area in not-good condition (1,200.23 km²). The minimum area in good condition (559.09 km^2) and maximum area in not-good condition (1,607.39 km^2) are based on data from the current reporting period. The short-term trend is considered to be *uncertain*. During the previous reporting period (NPWS, 2019), 44.6% of the 4030 habitat was deemed to be in good condition and in the current reporting period 25.8% is deemed to be in good condition. While this could be interpreted as a *decreasing* trend, direct comparison between the datasets is not possible as they are from different sites. The data available from both monitoring periods have been collected on an *ad hoc* basis, representing baseline monitoring rather than repeated assessments from a national monitoring network. The dataset also has a limited national distribution and sample size. The *uncertain* assessment is based on expert opinion, as there is insufficient evidence that national status has improved or declined. When the 124 stops from the current reporting period are reviewed, the most frequent criteria to fail the Structure and functions assessment were 'number of bryophyte or non-crustose lichen species' (49.2%), 'all growth phases of *Calluna vulgaris* present in the local vicinity' (40.7%), 'number of positive indicator species' (23.4%) and 'cover of disturbed bare ground in the local vicinity' (23.4%). Due to the limited coverage of the assessment plots these failures may reflect site-specific issues rather than national trends. As with the Area assessment, the majority of the data informing the Structure and functions assessment were from SACs. The area of 4030 habitat in good condition outside of SACs is likely to be significantly less due to lower levels of protection and scrutiny.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	High
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Medium
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low

PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R11544 *Picea sitchensis* R18691 *Pinus contorta* subsp*. contorta* R12976 *Rhododendron ponticum* R03227 *Cervus nippon* R02685 *Campylopus introflexus*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. European Innovation Partnerships (EIPs) project websites and online publications (where available): Blackstairs Farming Futures (BFF) EIP (https://assets.gov.ie/291923/fcfdc3f0-5358-4a86-a3de-98f4b0489bd6.pdf); Sustainable Uplands Agri-environment Scheme (SUAS) EIP (https://wicklowuplands.ie/suasproject/suas-documents/). Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) Annual Fire Reports. Accessed from: https://forest-fire.emergency.copernicus.eu/reports-and-publications/annual-fire-reports. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union, 1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services.

	NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Personal communications with Senior NPWS staff including NPWS Upland Habitats Ecologist, Regional Managers and District Conservation Officers. Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Site Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., J. Bailey, & O'Toole, L. (2024) The 2022 National Survey of breeding Hen Harrier in Ireland. Report prepared by Irish Raptor Study Group (IRSG), BirdWatch Ireland (BWI), Golden Eagle Trust (GET) for National Parks and Wildlife Service (NPWS). *Irish Wildlife Manuals*, No. 147. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Sargent, N. (2020) Ireland's tree-planting policies are bad news for biodiversity. *The Journal*. Accessed from: https://www.thejournal.ie/spruced-up-pt1-5241271-Oct2020/.
7.4 Additional information *Optional*	Pressures and threats presented in section 7.1 were selected and ranked based on intensity (high, medium, low), frequency of occurrence, and area of impact where data were available. EIP project data were only used where the project documentation specifically assigned a pressure or threat to a specific Annex I habitat or Fossitt (2000) equivalent. While baseline upland habitat surveys are on-going in the Republic of Ireland (e.g. NSUH, LIFE IP Wild Atlantic Nature), there is no national monitoring network for the 4030 habitat. Data from the current reporting period represents only a small proportion of the data collected on upland habitats to date. Therefore, the pressure and threat data used to inform the previous reporting periods (NPWS 2019, 2013b) were reviewed, with expert judgement applied to evaluate their continued relevance to the current assessment. PA07 'Intensive grazing or overgrazing by livestock' was identified as a high-influence pressure, with PA08 'Extensive grazing or undergrazing by livestock' identified as a low-influence pressure. Overgrazing can reduce diversity of the 4030 vegetation, can damage vegetation structure and deplete or entirely remove dwarf shrub cover, and can cause physical damage leading to soil erosion. PA07 was recorded at Slieve Bloom Mountains SAC (000412) which is one of the five NSUH sites surveyed during the current reporting period. This SAC recorded overgrazing as having a medium negative effect over a limited area (Rigoni *et al.,* 2023). The SUAS EIP (2018-2022) and

	Blackstairs Farming Futures EIP (2018-2023) reported overgrazed areas (sheep) and undergrazed areas within 4030 habitat. PA09 'Burning for agriculture' and PH04 'Vandalism or arson (incl. human-introduced wild fire)' were identified as high-influence pressures. These pressures can lead to degradation and loss of upland habitats (Perrin *et al.* 2014c). Unregulated burning can reduce plant species diversity and the ericoid component of the vegetation, as well as often causing significant damage to the bryophyte layer. Burning also contributes to peat erosion, habitat desiccation and may encourage the spread of *Pteridium aquilinum* and grasses, which can become dominant to the exclusion of most other species. Burns that are too frequent or severe can result in habitat loss (Glaves *et al.* 2013). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) annual reports were reviewed (https://forest-fire.emergency.copernicus.eu/reports-and-publications/annual-fire-reports). In 2019, 3,700 ha of non-forest land was affected by fire in Ireland. The 2019 report notes that a significant number of upland fires occurred close to the end of the permitted season for controlled burning, particularly in and around Wicklow Mountains National Park. In April 2019, a fire took place in Killarney National Park, with another large-scale fire that burned 1,000 ha in Annagry, Co. Donegal. In 2020, 3,500 ha of non-forest land was affected by fire, with agricultural land including upland areas used for grazing accounting for 1,750 ha of the total area burned. The 2021 annual fire report notes that 3,100 ha of non-forest land was affected by fire. Illegal agricultural burning was observed during March and into early April 2021, notably in Counties Wicklow and Laois. Another fire took place in Killarney National Park in April 2021, covering over 2,000 ha of mountain terrain. In 2022, 2,900 ha of non-forest land was affected by fire, with 5,600 ha affected in 2023. Most of the observed fires in 2023 occurred in the first quarter, predominantly in south-western counties, being strongly associated with burning of extensive agricultural land used for upland grazing. To further analyse the direct impacts of these fires on the 4030 habitat, an EFFIS burnt area shapefile for the Republic of Ireland, based on MODIS imagery was sourced, covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped 308 large fire events in the Republic of Ireland covering a total area of 18,590 ha. The 4030 habitat polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. These indicate that approximately 4,172 ha of 4030 habitat were subject to a large burn event during the current reporting period. Three of the five NSUH sites surveyed during this reporting period noted 4030 habitat impacted by recent burns. Recent burns impacted less than 1% of 4030 within Ballyhoura Mountains SAC (002036); 5.8% of 4030 within Loughatorick South Bog SAC (000308); and 2.6% of 4030 within Slieve Bloom Mountains SAC (000412). EIP projects that reported damaging fires within 4030 habitat included the SUAS EIP (2018-2022) and Blackstairs Farming Futures EIP (2018-

	2023). The SUAS EIP identified uncontrolled burning as the main activity resulting in the unfavourable condition of many of the commonages and upland farms assessed. Fires within the Wicklow Mountains have been mapped by NPWS. These data highlight that some commonages have been burnt repeatedly in recent years, leaving no time for habitat recovery between burns. Regular uncontrolled fires prompted the Wicklow Upland Council (WUC) to condemn these events in 2019, with the group noting that 'the Wicklow and Dublin Uplands have seen a rise in the extent and frequency of unregulated burning in recent years, highlighting a greater need for controlled burning practices to be implemented'. The Blackstairs Farming Futures EIP report noted that while the project was operational it "helped to encourage continued management of the heathland habitats, and a moratorium on burning reduced the number of fires on the hills. However, the project failed to establish protocols with state bodies for controlled burns and now fires are increasing in the area once more". PM07 'Natural processes without direct or indirect influence from human activities or climate change' was recorded as a low-influence pressure in NPWS (2019) but was moved to a medium-influence pressure during this reporting period. This pressure (i.e. natural erosion within 4030) was recorded from commonages in the Blackstairs Farming Futures EIP (2018-2023). Analyses of the 124 monitoring stops conducted in 4030 habitat this reporting period indicated 23.4% of stops failed the 'cover of disturbed bare ground in the local vicinity' criterion. This criterion indicates the presence of bare ground that is disturbed (e.g. by animal or humans) and the % reported shows that bare ground is a relatively frequent feature of the SACs assessed. Peat soils are prone to erosion where levels of grazing or trampling by sheep are excessive, or where burning has occurred. Without remedial action, areas of bare peat typically continue to erode due to climatic conditions regardless of removal or control of the causal factors (i.e. excessive grazing and burning). Wicklow Mountains National Park (NP), for example, has 435 ha of bare peat, as highlighted by intersecting the National Land Cover (NLC) bare peat polygons with the NP boundary. This represents 1.18% of the total area of Wicklow Mountains NP (36,883 ha). PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure this reporting period. Afforestation can result in direct habitat loss, as well as fragmentation of the 4030 habitat. NSUH surveys reported loss of 4030 habitat to afforestation at four of the 21 sites surveyed to date; three of these NSUH sites were SACs. A selection of forestry licence appeal cases were analysed by Sargent (2020) highlighting that during the current reporting period, licences had been granted for planting within peatlands or close to these sensitive ecosystems. The 2022 National Survey of Breeding Hen Harrier noted afforestation as one of the main factors responsible for the loss of Hen Harrier foraging and nesting habitats, which include open, heather-dominated upland habitats (i.e. heaths and/or blanket bogs) (Ruddock *et al.,* 2024). Regional NPWS field staff have highlighted that loss of heath habitat to forestry has likely occurred within the current reporting period.

	Since 2024, guidance on the 'Land Types for Afforestation' have been revised, with stricter criteria in place for planting on peat, as well as a continuation of the previous guidance that afforestation of dry heath is not permitted (DAFM, 2024). There is a drive by DAFM to increase Ireland's annual rates of afforestation which could increase pressure on 4030 habitat outside of protected sites. Atypical examples of dry heath are at greatest risk of afforestation (e.g. grassy examples or severely overgrazed sites), as such sites may not be readily identifiable as heath by non-specialists. PD01 'Wind, wave and tidal power (including infrastructure)' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure this reporting period. Wind farms can result in direct habitat loss (e.g. turbine foundations, vehicle access roads, sub-stations) and degradation of the surrounding 4030 habitat. Available wind farm data (https://data.gov.ie/dataset/wind-farms-in-ireland) are generally provided as a single point for each wind farm development. NPWS (2019) analysis assigned a 2 km buffer to each wind farm point, with this buffer considered representative of the spread of an average upland wind farm development. This 2 km buffer was applied to the wind farm dataset (dated June 2022) with locations of wind farms assessed in relation to the mapped 4030 distribution. A buffer of 1 km was also applied to take account of smaller developments. This review highlighted that 64.2% of all wind farms are within 2 km of 4030 habitat, with 53.0% of wind farms within 1 km. A second analysis was conducted to assess wind farms constructed within this reporting period (2019-2022), 73.2% of new wind farms are within 2 km of 4030 habitat, with 65.9% within 1 km. These analyses indicate that wind farm locations are, and continue to be, strongly associated with the distribution of the 4030 habitat. Low-influence pressures featuring in NPWS (2019) that were recorded as 4030 pressures during the current reporting period comprise: PI02 'Other invasive alien species (other than species of Union concern)', PF05 'Sports, tourism and leisure activities' (e.g. all-terrain vehicle use, walking), PI03 'Problematic native species', PE01 'Roads, paths, railroads and related infrastructure' and PM05 'Avalanches, landslides and collapse of terrain'. These were retained as low-influence pressures for this reporting period. Low-influence pressures solely recorded in the current reporting period comprise: PA10 'Livestock farming (without grazing)' (i.e. supplementary feeding), PB26 'Other forestry activities, excluding those relating to agro-forestry' (i.e. firebreaks) and PL02 'Drainage'. Low-influence pressures solely recorded in NPWS (2019) comprise: PA25 'Agriculture activities not referred to above' (e.g. agricultural intensification–removal of semi-natural vegetation, reseeding and fertilisation for pasture), PA05 'Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)', PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)', PF01 'Conversion from other land uses to built-up areas', PK03 'Mixed source air pollution, air-borne pollutants' and PH06 'Closure or

	restricted access to site/habitat' (e.g. fences). These were retained as low-influence pressures for this reporting period. Climate change (mainly as PJ01 'Temperature changes and extremes due to climate change' and PJ03 'Changes in precipitation regimes due to climate change') is assessed as a low-influence pressure but is considered to be a medium-importance threat to 4030. Renou-Wilson & Wilson (2018) indicate areas will be impacted by climate-induced disturbances, "including (1) gradual changes (in temperature; in the amount, intensity and seasonal distribution of precipitation) and (2) extreme events (severe drought; increased wildfires; flooding events)". Areas in unfavourable condition will be more susceptible to the impacts of climate change. Concerns relating to prospective seasonal changes include increases in winter rainfall leading to enhanced erosion. An increased risk of severe fire events is likely in areas where drought periods increase as a result of climate change. Intense fires can burn away the shallow peat soil or expose it to erosive elements such as extreme rainfall events. Invasive non-native species may also pose a greater risk to 4030 habitat if their growth conditions are more favoured by changes in climate (e.g. *Rhododendron ponticum, Pinus contorta*, *Picea sitchensis*). Intense summer heats causing desiccation and cracking of the surface peat, followed by subsequent intense rainfall events may be expected to increase the risk of peat landslides (Dykes, 2008, 2022). The five high and medium-influence pressures reported in section 7.1 are also considered to be the main threats to the 4030 habitat in the future, along with climate change.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MK01 Reduce impact of mixed source pollution

	MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Conservation measures for the 4030 habitat were selected using data gathered from the NSUH (Rigoni *et al*. 2023; Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), NPWS, INTERREG VA projects, EU LIFE IP projects, EIP-AGRI projects, Coillte and the Department of Agriculture, Food and the Marine (DAFM). The most widely applied measures comprise those related to agricultural practices (MA). During the current reporting period, the LIFE IP Wild Atlantic Nature (WAN) and numerous European Innovation Partnerships (EIPs) have built capacity for the CAP Strategic Plan 2023, and the learnings from these projects have informed the development of Irelands new national Agri-environmental scheme (ACRES, 2023-ongoing). Further details on each of these projects are provided below. As outlined in section 8.2, it is estimated that the scope of measures taken impacted less than 50% of the 4030 habitat. Participation in Agri-environmental schemes does not guarantee positive management measures will be undertaken. However, the adoption of results-based scoring, linking improved habitat condition to higher payments, does provide an incentive to landowners to improve habitat condition. Conservation projects within blanket bogs were included here as dry heath can occur within blanket bog expanses on ridges, rock outcrops or in locations with small-scale topographic variations. However, only those projects that have had a demonstrable impact on the 4030 habitat, or were likely to have had a positive impact, have been included below. The maintenance of extensive grazing (MA03) was recorded three times across the sites surveyed by the NSUH during the current reporting period, as a conservation measure with either a neutral or positive impact on the 4030 habitat. EU LIFE IP Wild Atlantic Nature (WAN) is a nine-year environmental project (2021-2029) that aims to improve Ireland's performance in conserving habitats, and in particular to improve the conservation status of blanket bog SACs. Though the focus is on blanket bogs, it is anticipated this project will also result in an improvement in the condition of 4030 habitat within the project area. Within the WAN project area, there are 35 blanket bog SACs (of which 24 are conservation action sites) with a total area of 262,632 ha. Project actions include: habitat mapping and condition assessment, habitat restoration planning and implementation, ecosystem management, monitoring the effects of actions, capacity building and education/awareness raising. Central to the project was a pilot Results-Based Payment Scheme (RBPS) conducted 2021/22. Over 820 farmers across 63,000 ha of Natura 2000 and neighbouring lands participated in the pilot (MA04, MA05, i.e. reinstating or adapting management such as grazing). Additional support actions in the RBPS scheme that likely benefitted the 4030 habitat included: fencing (MA05) and invasive species control (MI03). This pilot RBPS built

	capacity for the CAP Strategic Plan 2023, and its learnings informed the development of the Agri-Climate Rural Environment Scheme Co-operation Project (ACRES CP). The WAN project is also developing a retrofitting and restoration pilot to help address turf-cutting in SACs by providing homeowners with alternative energy sources. This pilot is looking to demonstrate the deep retrofitting of homes as a way to reduce demand for turf. Simultaneously, participants will agree to restore turbary in SACs and agree to manage peatland habitats on their farms in a sustainable manner (WAN, 2024). This latter action has the potential to benefit the 4030 habitat. The Dúlra Project (a collaboration between FORUM Connemara's Agri-EIP, the North Connemara Locally Led Agri-Environmental Scheme and the Leenane Development Association) is primarily involved in the control of the invasive Rhododendron (MI03) in parts of the Twelve Bens/Garraun Complex SAC (002031), the Connemara Bog Complex SAC (002034) and the Mweelrea/Sheeffry/Erriff Complex SAC (001932). Funding is provided by the NPWS via the EU LIFE IP WAN (https://www.dulraproject.com/). Agri-Climate Rural Environment Scheme (ACRES) is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high priority geographical areas are included under ACRES Co-operation Project (ACRES CP), with eight CP zones nationwide. ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. The peatland scorecard is the dominant scorecard used for ACRES CP; it is applied on 166,541 ha of private land and 394,836 ha of commonage (Muldowney, 2024). Each peatland scorecard has environmental indicators relating to ecological integrity (e.g. number of positive indicators, cover of bryophytes and lichens, grazing levels etc.), hydrological integrity, and threats and future prospects (e.g. erosion, bare peat, non-native plants, bracken, etc.). Farmers can increase their payments by adjusting management practices (MA04, MA05) and/or undertaking Non-Productive Investments (NPIs) or Landscape Actions (LAs) that will benefit habitats. Undertaking NPIs and LAs can increase payment up to €17,500 over the five years of the contract. NPIs differ from Landscape Actions (LAs) in that they are generally smaller in scale (e.g. wildlife boxes, bracken control (MI05), tree planting, fencing (MA05), installing gates, scrub removal (MI05)). Rollout of LAs will take place in Q2-Q3 2025. The provisional list of proposed LAs includes a number of landscape actions that could assist in restoring degraded peatlands. These include: invasive species control, virtual fencing, targeted grazing by bovines/goats/equines, ditch/peat reprofiling, erosion control (e.g. using geotextiles) and drain blocking with peat plug/timber dam/coir rolls. The uptake of these LAs and their scale of impact will not be known until the next reporting period. Analyses of the initial ACRES data are underway to determine the impacts of the scheme, although quantifiable improvements are likely to take a number of years.

	Low-emission slurry spreading reduces nitrogen losses to the air and subsequent nitrogen deposition in sensitive habitats. There is currently a Low Emission Slurry Spreading (LESS) Equipment Scheme available to farmers to assist them to buy new slurry-spreading equipment. ACRES also promotes the practice of low-emission slurry spreading amongst participating farmers by issuing a payment to farmers for adopting the measure (MK01). A number of locally led European Innovation Partnerships (EIPs) with an upland focus were in operation this reporting period. Ecologically sustainable grazing was typically a cross-cutting deliverable, with many of these schemes applying results-based scoring of habitat condition. Education, raising awareness and supporting hill farmers were also key features of these schemes. The learnings from these EIPs informed ACRES CP. Relevant EIPs comprise: - Blackstairs Farming Futures (BFF) Sustainable farming project in the Blackstairs Mountains (2018-2023). Actions within commonages that contain 4030 habitat include: sustainable grazing by sheep and cattle (MA04, MA05), bracken control (MI05), scrub control (MI05), invasive species control (MI03) and fencing (MA05). Eight of the nine commonages improved their habitat condition score during the project. The project helped to encourage the continued conservation management of heath habitats and a moratorium on burning reduced the number of farmer-lit fires (MA06). - The Sustainable Uplands Agri-environment Scheme (SUAS) (2018-2022) was initiated by the Wicklow Uplands Council. Actions within commonages that contain 4030 habitat included: controlled grazing (MA05), controlled burning (MA05), bracken control (MI05), invasive species control (MI03), heather and gorse mulching (MA04, MI05). - A Sustainable Agricultural Plan for the MacGillycuddy Reeks - Conservation and restoration of Upland Habitat in the MacGillycuddy Reeks (2018-2021). Actions: sustainable grazing by cattle and sheep (MA04, MA05), invasive species control (MI03), heather thinning (MA04), fencing to exclude grazers (MA05), cessation of burning (MA06), management of recreational impacts (MF03) and trail maintenance (ME01). Fourteen land parcels saw improvement in their baseline condition score, five land parcels remained unchanged, and one land parcel declined by five points. The project report notes “whether it is controlled grazing with sheep and cattle, or the treatment of invasive species such as bracken and rhododendron, several years are required to see measurable changes on the ground”. - Locally Led Scheme for the Conservation of the Hen Harrier (2017-2023). This EIP targeted lands in six Special Protection Areas (SPAs) designated for breeding Hen Harrier. Actions: conservation grazing (MA04), controlled grazing (MA05), invasive species control (MI03), controlled burning – under special circumstances (MA05) and fencing (MA05). - Inishowen Upland Farmers Project (2019-2023) operated on the Inishowen peninsula, Co. Donegal. Actions: Conservation grazing using cattle (MA04).

	- Pearl Mussel Project - Farming for nature in a vibrant rural economy (2018-2023). This project focused on the top eight Freshwater Pearl Mussel catchments. Actions: sustainable grazing (MA04, MA05), invasive species control (MI03) and fencing (MA05). - North Connemara Locally Led Agri-environmental Scheme (2019-2023) operated within the Maumturks and Twelve Bens/Garraun mountain ranges. Actions: fencing (MA05) and invasive species control (MI03). - Comeragh Uplands and Communities EIP Project (2021-2022) operated in the Comeragh Mountains, Co. Waterford. Actions: prescribed burning training (MA05). Two EU INTERREG VA projects, Cooperation Across Borders for Biodiversity (CABB) and Collaborative Action for the Natura Network (CANN), undertaken this reporting period, were directly connected to the protection and restoration of Natura 2000 sites. As part of CABB (2017-2022), fencing and a sustainable grazing management plan were instigated within an area of state-owned land in the Dunragh Loughs/Pettigo Plateau SAC (001125) (MA05, MA04). Conservation Action Plans were drafted for four blanket bog SACs that have 4030 habitat (i.e. Lough Nillan Bog (Carrickatlieve) SAC (000165), Croaghonagh Bog SAC (000129), Dunragh Loughs/Pettigo Plateau SAC (001125) and Meentygrannagh Bog SAC (000173)). As part of CANN (2017-2022), restoration actions in Cuilcagh-Anierin Uplands SAC (000584) that may have benefited the 4030 habitat included: invasive species control (MI03), the development of wildfire management plans (MA05) and track development to reduce impacts on sensitive habitats (ME01). Actions at the cross-border site Sliabh Beagh included: invasive species control (MI03), wildfire management plans (MA05) and conservation grazing (MA04). The CANN project also trained local landowners in peatland restoration techniques. Within Ireland's National Parks (NPs), Wicklow Mountains NP is undertaking peatland restoration trials. At Barnacullian, NPWS staff commenced restoration in 2022. Actions within 4030 habitat at this restoration site comprise: fencing (MA05) and heather cutting (MA04). Wicklow Mountains NP staff also work towards control of Rhododendron and Sika Deer (MI03). Glenveagh NP work towards control of Red Deer (MI05), Rhododendron (MI03) and Prickly Heath (MI03). Connemara NP undertakes Rhododendron control (MI03). The NP has acquired a small herd of Irish Moiled cattle which they intend to use for conservation grazing (MA04). The Mweelin Sheep Exclosure Project (MA06) was initiated to allow 24 ha of the NP to recover from unsustainable grazing. The NP website states that "this work may demonstrate the need for this management method across the whole National Park". It may also prove useful as a demonstration site for the effects of stock and grazing management beyond the NP. Killarney NP work towards Rhododendron control (MI03) and deer management (MI03 (Sika Deer) and MI05 (Red Deer)).

	Páirc Náisiúnta na Mara, Ciarraí, Ireland's newest National Park, incorporates Mount Brandon Nature Reserve, which has ongoing conservation grazing using cattle within the 4030 habitat (MA04). Staff in Irelands National Parks are typically involved in maintenance of tracks and trails to prevent or minimise damage to sensitive habitats (ME01), work to reduce incidences of illegal dumping (MK01) and illegal fire activity (MA05) and enforce the Ministerial Direction 2010 on the use of All Terrain and Off-Road Vehicles (MF03). Coillte are currently increasing the area of their estate managed primarily for nature, from 20% to 30% by 2025. Any remaining open habitat (e.g. heath, bog) not currently in an existing Coillte 'Biodiversity Area' will be identified by this project and a set of provisional management prescriptions drawn up. Poorly developed conifer plantations on peat are also being targeted, with a view to restore these areas to open peatland habitats (MB14). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) EFFIS annual reports noted that several landowners had financial penalties imposed under farm payment schemes by DAFM this reporting period, particularly where burning was found to occur outside of the legally permitted period. There were also incidences where farmers were penalised when fires were permitted to burn overnight from February 28th into the illegal period commencing March 1st (MA06). The NPWS Farm Plan Scheme protects key species and habitats through the delivery of site-specific conservation measures at farm level. Polygons containing dry heath (HH1 or HH2) were extracted from the NPWS Farm Plan shapefile (NPWS_FarmPlans_2019_2023.shp). Measures recorded in these polygons included: controlled grazing (MA05, *n*=11 polygons), fencing (MA05, *n*=3), conservation grazing with non-native breeds (MA04, *n*=3), conservation grazing with rare native breeds (MA04, *n*=2) and grazing cessation (MA06, *n*=2). The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Microsoft Excel spreadsheet was reviewed for measures associated with the 4030 habitat. Measures listed comprise: invasive species control (MI04, *n*=10 records), vegetation management such as heather cutting (MM01, *n*=4), fence replacement and targeted grazing (MA05, *n*=2), wildfire suppression (MA06, *n*=2) and native deer control (MI05, *n*=1). The extent of 4030 habitat impacted by the CMP is unknown as exact areas were not provided. Since 2024, afforestation is only permissible on peat soils with a depth of 30 cm or less. This replaces the former allowance (pre-2024) for afforestation on peat with a depth of 50 cm or less. A new spatial layer is available on INET/IFORIS, with this layer being a composite of the Derived Peatland map V2, National Landcover map and Irish Soils Database. It will be assumed for the purpose of afforestation applications that peat soils within these areas are as categorised, unless proven otherwise (MB01). (Accessed from: https://assets.gov.ie/268255/3df078e5-131e-4434-88ee-8a8361ce3330.pdf.) This measure may result in a reduction of 4030 habitat impacted through afforestation but will not preclude this from

	occurring, especially since 4030 is a habitat associated with shallow peats. The Irish NGO, Friends of the Irish Environment (FIE) challenged the 30 cm allowance, highlighting that the new guidance failed to take on board the United Nations 2022 advice to protect all peat soils deeper than 10 cm (FIE, 2023).

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** / *Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current Range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current area is less than the Favourable Reference Area (<10% below FRA). Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative*, as PD01, PM07, PB01 and PA09, in combination with several low-influence pressures (e.g. PA25, PM05, PF05) are expected to have a *negative* influence on area, especially for areas of 4030 habitat outside of SACs, even with conservation measures in place. Future prospects of Area are therefore *Poor*. Short-term trend direction for habitat that is in good condition is *stable*. Current Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A minimum estimate of 55.4% of 4030 habitat is in unfavourable condition. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. Future trend of Structure and functions is assessed as *uncertain*. Although PA07 and PA09 are expected to have a negative influence on Structure and functions, their presence is not expected to change the overall status of Structure and functions within the next 12 years. Where the conservation measures MA04, MA05 and MA06 occur they would be expected to balance the threats, however it should be noted that these are not implemented across the national distribution of the habitat, nor are they specifically targeted measures for the 4030 habitat. Future prospects of Structure and functions are therefore *Bad*.	

<table>
<tr><th colspan="3">10 Conclusions</th></tr>
<tr><td colspan="3">Assessment of conservation status at end of reporting period</td></tr>
<tr><td>10.1 Range</td><td colspan="2"><u>Favourable (FV</u>) / Inadequate (U1) / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.2 Area</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.3 Specific structure and functions (incl. typical species)</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2</u>) / Unknown (XX)</td></tr>
<tr><td>10.4 Future prospects</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2)</u> / Unknown (XX)</td></tr>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad (U2</u>) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td><u>d) yes, due to the use of different method</u></td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is Favourable in this reporting period, as it was in the previous reporting period.
The Conservation Status of Area is Unfavourable-Inadequate in this reporting period, as it was in the previous reporting period.
The Conservation Status of the Structure and functions and Future prospects are Unfavourable-Bad in this reporting period, as they were in the previous reporting period.
The Overall Conservation Status was assessed as Unfavourable-Bad, as it was during the last reporting period. The status of Unfavourable-Bad during the current reporting period was due to <25% of the area of</td></tr>
</table>

	4030 habitat being assessed as having favourable Structure and functions. Trend in Overall Conservation Status was assessed as *deteriorating* this reporting period, whereas it was assessed as *stable* in the previous reporting period. The deteriorating trend is largely due to area losses within the current and previous reporting period. This has resulted in a *decreasing* short-term trend for Area. Short-term trends for Range and Structure and functions are assessed as *stable*.

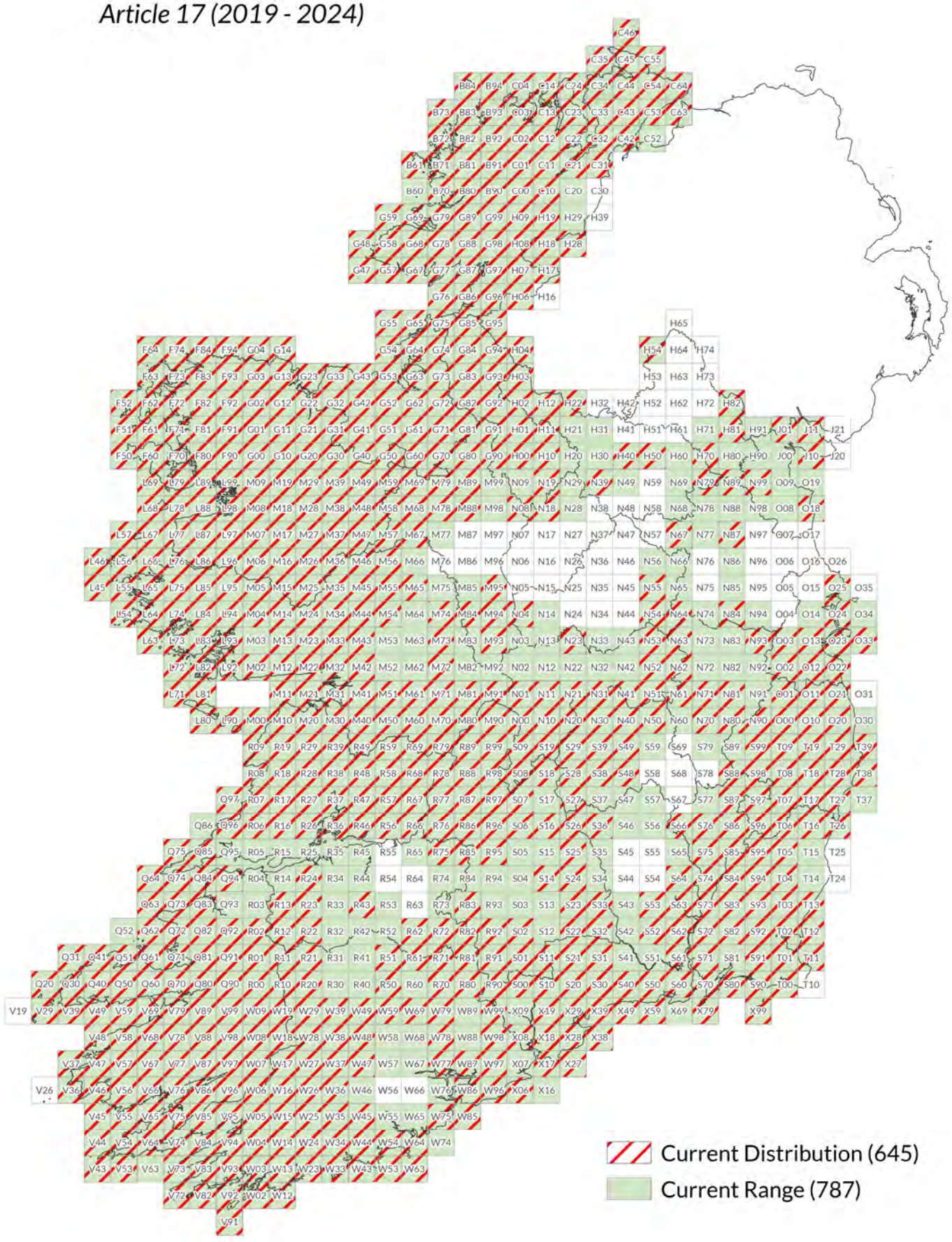
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1,084.11 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	

11.8 Additional information *Optional*	Area within the network were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 (1084.11 km^2) is the estimated total area of 4030 habitat in SACs in the country (50.0% of the total national area), including SACs where 4030 is not listed as a qualifying interest (QI). The area of 4030 habitat within the SAC network where 4030 is listed as a QI is estimated at 711.90 km^2. The surface area of recorded 4030 habitat within the SAC network has increased since the last reporting period as a result of improved knowledge, allowing a refinement of area totals. The short-term trend of the 4030 habitat area within the SAC network is taken to be *decreasing*, the same trend as the 4030 habitat area nationally (section 5.7). Using the GSI (2024) landslide extent dataset, approximately 1.1 ha was lost through landslides within SACs in this reporting period. The short-term trend of 4030 habitat area in good condition within the SAC network is assumed to be *stable*.

12 Complementary information *N/A*

Dry heaths (4030)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**4060 Alpine and Boreal heaths**
1.2i Habitat short name	**Alpine and subalpine heath**
1.3i Habitat description	Two distinct subtypes of habitat 4060 Alpine and Boreal heath have been identified as occurring in Ireland. The most widespread subtype occurs in an upland peatland context, mainly above 450-500m altitude, but also occurs close to sea level in exposed coastal situations in north-western Ireland. It can also occur as secondary vegetation where blanket peat has eroded. The vegetation is characterised by the presence of low-growing wind-clipped dwarf shrubs, the most characteristic of which is *Calluna vulgaris*, with an abundance of the moss *Racomitrium lanuginosum* also typically present (Hodd & Sheehy Skeffington, 2011). A suite of specialised Arctic- or Boreal-montane species may occur within 4060 habitat, especially at higher altitudes, but their presence is not required to identify habitat corresponding to 4060. The second subtype occurs in lowland and low upland areas on karstic limestone in the Burren and adjacent areas. It consists of calcareous heath, characterised by the occurrence of the Arctic/Boreal-montane shrubs *Dryas octopetala* and *Arctostaphylos uva-ursi*, alongside typical species of calcareous grassland (Hanrahan & Sheehy Skeffington, 2015). Where *D. octopetala* is prominent, these heaths have affinities to the habitat 6170 Alpine and subalpine calcareous grasslands; however a review of the latter concluded that, based on current data, heaths with *D. octopetala* dominant should remain within 4060 for now (Hodd *et al.*, in prep.). Most examples of Irish Vegetation Classification (IVC) heath communities *Dryas octopetala – Sesleria caerulea* (HE1a), *Calluna vulgaris – Nardus stricta* (HE3C), *Calluna vulgaris – Racomitrium lanuginosum* (HE3D), *Racomitrium lanuginosum – Festuca vivipara* (HE3E) and *Juncus squarrosus – Rhytidiadelphus loreus* heath (HE3G) correspond to habitat 4060, with other communities within HE3 also having some affinities with 4060 (Perrin, 2024).

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1949-2023***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4060 or Fossitt code HH4 (Fossitt, 2000), a relevant NPWS or Irish Vegetation Classification (IVC) habitat code. Sources added to the distribution map in this reporting period are: two National Survey of Upland Habitats (NSUH) sites (Rigoni *et al.* 2023; Barron *et al.* 2022), Hodd (2023), Hodd *et al.* (in prep.), Martin *et al.* (2023), Scott Cawley (2021), Parr & Jeuken (2021), the National Fen Survey 2021 to 2023 dataset (Brophy *et al.*, in prep.), the EU INTERREG CABB habitat surveys and R.L. Hodd (personal records). In addition to these, the sources utilised for the distribution map from the last two reporting periods (NPWS, 2013b, 2019) that were included comprise: Barron & Daly (2015), Coillte Biodiversity Dataset (various dates), Curtis & Wilson (2014), Galway County Council (2017), Hodd (2015, 2016), Martin *et al.* (2018), O'Neill & Martin (2018), O'Neill *et al.* (2020), Perrin (2024) which comprises data ranging from 1959 to 2014, Tubridy *et al.* (2015), 15 National Survey of Upland Habitats (NSUH) sites (Perrin *et al.* 2011, 2012, 2013a-e, 2014a, 2014b; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012a), Barron & Perrin (2011), Ballycroy, Connemara and Glenveagh National Park Habitat Maps, Crushell & O'Callaghan (2008), Murphy & Fernandez (2009), NPWS (2007, 2013a), NPWS Habitat Assignment Project, Parr *et al.* (2009) and GIS files from the Uplands and Peatlands Grazing Survey (NPWS). All references are detailed below in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. Certainty values from the datasets utilised during the last reporting period were not reassigned for the purposes of the distribution map. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. BirdWatch Ireland CABB surveys (2019-2020) GIS files for this INTERREG VA project were made by BirdWatch Ireland & NPWS. Brophy *et al.* (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Hodd, R. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Report for Hometree, Ennistymon, Co. Clare. Hodd, R.L. Personal records used to populate the 4060 habitat point distribution shapefile. Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) The status of four uncommon grassland types in Ireland. *Irish Wildlife Manual*, No. 1XX. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Martin, J.R., O'Neill, F.H., Daly, O.H. & Woods, K.M.S. (2023) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats 2021-2023. *Irish Wildlife Manuals*, No. 146. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Parr, S. & Jeuken, N. (2021) Linking Burren data project. Unpublished report for NPWS. Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Site Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG.

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4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***35,200 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
b) Based mainly on extrapolation from a limited amount of data
<u>c) Based mainly on expert opinion with very limited data</u>
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 35,200 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">There is no evidence of loss of range since the Directive came into force.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of 4060 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool.

Short-term trend for Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). There was no loss of range despite the recorded losses of area during these two reporting periods. The short-term trend in Range is therefore judged to be stable.

Due to refinement of the distribution of 4060 habitat in the current reporting period, there is a decrease in range of 13 10x10 km grid cells between the last reporting period (365 grid cells) and the current reporting period (352 grid cells). This is due to removal of polygons</td></tr>
</table>

	previously included in the distribution that consist of 100% forestry and therefore are highly certain not to support 4060 habitat (resulting in removal of 8 grid cells) and from refinement of the distribution of 4060 habitat in the Slieve Bloom Mountains due to more accurate mapping by the NSUH survey of Rigoni *et al*. (2023), since polygons covering all areas over 350 m altitude had previously been included (resulting in the removal of 3 grid cells). The Favourable Reference Range (FRR) follows the premise used in NPWS (2007) that the current estimate of range is the FRR as there has been no decline since the Directive came into force in 1994, and no enlargement of range is deemed necessary to ensure the long-term survival of the habitat. The FRR is the current range, reported in section 4.1. The FRR has decreased since the last reporting period (NPWS, 2019) to reflect the improved level of knowledge, rather than representing an actual loss of range.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1949-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***147.73 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing / decreasing /* ***uncertain*** */ unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12% (negative)*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/* ***pre-defined range***	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">Unknown</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 1949 when bog and heath relevés were recorded by Braun-Blanquet and Tüxen (data utilised in Perrin, 2024) and incorporates updates made by surveys up until 2023. A full list of these resources is presented in section 3.4.

Area was calculated from the polygon shapefile and point shapefile used for distribution. Each point record not located within or directly adjacent to a polygon had an area of 0.94 ha of 4060 habitat applied, which is the average area of 4060 within polygons containing the habitat recorded by the NSUH.

The surface area of 4060 reported has decreased from 150.74 km² in NPWS (2019) to 147.73 km² in this reporting period, due to refinement of the distribution polygons, through improved mapping by the NSUH and other surveys and removal of polygons consisting entirely of forestry, as outlined in section 4.14. The area within many of the remaining polygons is likely to be overestimated, specifically those</td></tr>
</table>

	that are retained from the 2007 report, covering areas over 350 m altitude, where a cover of 5% 4060 habitat has been estimated. Most of the polygons covering areas over 350 m that have not subsequently been superseded by more accurate data represent low upland areas that do not obtain maximum altitudes of greater than 450-500 m and almost certainly contain very little or no 4060 habitat. However, there are no data to confirm that 4060 habitat is not present, so they are retained, subject to more detailed survey. These overestimations may be balanced by underestimations in other, higher altitude, upland areas, especially in Wicklow, South Kerry, Mayo and Donegal, for which detailed data are not available. Due to these considerations, the area value presented in section 5.2 is deemed to be a best estimate, rather than a minimum value, as was reported for the 2013–2018 period. Area loss has not been determined through systematic review as there is no monitoring network for the habitat. Of the datasets used to map the 4060 distributions, loss of area was only fully assessed during National Survey of Upland Habitats (NSUH) surveys. Eighteen NSUH datasets were used in the Area assessment (Barron *et al.* 2022; Rigoni *et al.* 2023, Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012), with loss of area of 4060 reported only from two of these sites. To investigate and estimate other potential losses, both within and outside the SAC network, two other national datasets were used. A Geological Survey Ireland (GSI) landslide extent dataset was sourced (GSI, 2024). This dataset mapped boundaries of past landslides. It was intersected with the 4060 polygon and point distribution shapefiles to determine the area of potential habitat loss. As for the windfarm dataset above, the results for polygons identified as being over 350 m altitude for the 2007 report (NPWS, 2007) were discounted, as they could not be assigned as a loss with any confidence. Additionally, in a number of instances, such as for the Wicklow Mountains SAC (002122), a percentage cover of 4060 habitat has been assigned to a polygon covering the whole SAC or NHA in previous reporting periods. As 4060 habitat is limited to higher altitude areas of these SACs and NHAs, the results for these polygons were also discounted, as to include all landslide events across these sites would produce a misleading result. Therefore, only polygons with a high certainty of containing 4060 habitat were included in the analysis. The 'Year' field in the landslide dataset was used to determine the timing of the event. This analysis indicated 1.02 ha of potential loss from landslides since 2013 (56.9% of this potential loss occurred in the current reporting period), and 1.5 ha of potential loss since 2000. While not all landslide events will result in permanent loss of the 4060 habitat, some events will leave only the subsoil or unstable rocky substrate remaining rendering it unsuitable for recolonisation. A further 11.7 ha of landslide events intersected the 4060 dataset, but either had no year assigned or occurred prior to 2000, so were not used in the analysis. The areas of potential loss derived from the above analyses were considered actual loss for the purpose of determining trend. Loss of area of 4060 through erosion was also reported by the SUAS EIP (2018 – 2022) project within the Wicklow Mountains, but no

	area was assigned. Smaller areas of erosion that would not be considered landslides are also likely to be leading to loss of 4060 Area across its range. Additionally, the extreme weather conditions that can prevail on mountain summits, in combination with land uses pressures, are such that habitat 4060 is vulnerable to degradation, from which habitat recovery can also be challenging. Therefore, these figures are considered minimum losses from this pressure. Short-term trend direction for Area was determined to be *uncertain*. Since 2013, approximately 0.044 ha of 4060 habitat within two NSUH sites (Ballyhoura Mountains SAC (002036) and Slieve Mish SAC (000412)) were determined to be lost due to recreational activity (Barron *et al.*, 2022) and erosion resulting from a landslide (Perrin *et al.*, 2014a), respectively. Additionally, as mentioned above, spatial analyses assigned 1.02 ha of loss due to landslides since 2013. The magnitude of the known loss was calculated as 0.0006% per annum measured over a period of 12 years. Although the magnitude of known loss is less than 1% per annum, actual losses of 4060 may be higher, as relevant data only exist from a small number of sites and are solely from SACs for this period. Measures are ongoing in several locations nationally that have the potential to reduce further losses. Long-term trend direction for Area was determined to be *decreasing*. Since 2000, a minimum of 1.51 ha of 4060 is calculated to have been lost, mainly through erosion by landslides and through trampling by recreational users, but that figure is likely to be an underestimation. Other sources of loss recorded, primarily by the SUAS EIP project in the Wicklow Mountains, but for which no figures or timeframe are available, are overgrazing and burning. Favourable Reference Area is deemed to be less than 2% smaller than the current area, given that anthropogenic losses have occurred since the Directive came into force. Significant losses are likely to have occurred in the past due to overgrazing, with areas that are now acid grassland, lacking shrub cover, particularly in West Galway and Mayo, likely to have at one time been 4060 habitat. However, most of these losses are likely to have occurred prior to the Directive coming into force. Current estimated losses within the SAC network are very small; however, losses of 4060 habitat outside of SACs are likely to be higher due to lower levels of protection and scrutiny, although no systematic national review of losses of 4060 have been conducted. Analysis of the 4060 mapped distribution and the SAC shapefile (SAC_2024_05_Matrix.shp) indicates 27.1% of 4060 habitat lies outside of the SAC network. This is why an uncertain trend for 4060 habitat has been selected.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***68.94 km²***
		Maximum	***87.90 km²***
	b) Area in not-good condition	**Minimum**	***59.83 km²***
		Maximum	***78.79 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	Typical indicator species from the NSUH (Perrin *et al.* 2014c) for upland 4060 habitat are: *Arctostaphylos uva-ursi, Calluna vulgaris, Carex bigelowii, Cetraria islandica, Cladonia arbuscula, Cladonia portentosa, Cladonia rangiferina, Cladonia uncialis, Diphasiastrum alpinum, Diplophyllum albicans, Empetrum nigrum, Erica cinerea, Erica tetralix, Herbertus hutchinsiae, Juniperus communis* ssp. *nana, Persicaria vivipara, Racomitrium lanuginosum, Salix herbacea, Scapania gracilis, Solidago virgaurea, Vaccinium myrtillus* and *Vaccinium vitis-idaea.* Typical indicator species from the NSLP (Wilson & Fernandez 2013) for lowland 4060 habitat are: *Arctostaphylos uva-ursi, Breutelia chrysocoma, Calluna vulgaris, Campanula rotundifolia, Carex caryophyllea, Carex flacca, Carex pulicaris, Cladonia rangiformis, Ctenidium molluscum, Dicranum scoparium, Dryas octopetala, Empetrum nigrum, Erica cinerea, Festuca* spp.*, Helianthemum oelandicum, Hylocomium splendens, Hypericum pulchrum, Juniperus communis, Linum catharticum, Lotus*		

	corniculatus, Molinia caerulea, Polygala vulgaris, Potentilla erecta, Scleropodium purum, Sesleria caerulea, Solidago virgaurea, Succisa pratensis, Thymus polytrichus and *Viola* spp.
6.8 Additional information *Optional*	Perrin *et al.* (2014c) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. There is no national monitoring network for the 4060 habitat, though monitoring stop data for the current reporting period was available from a limited number of sites from the NSUH and the SUAS EIP. A total of five monitoring stops were recorded in 4060 habitat across two NSUH sites within this reporting period. All stops passed on criteria assessing the vegetation composition, vegetation structure and physical structure of the habitat. Data for 10 monitoring stops recorded in 4060 habitat as part of the SUAS EIP (2018-2022) in the Wicklow uplands were also collated. Eight of these stops (80% of stops) failed the assessment on either one or more of the criteria. In total, 15 stops were recorded in the current reporting period. Seven of these stops (46.7%) passed the assessment of Structure and functions and eight (53.3%) failed. When these percentages are scaled up to the national area of 4060 habitat (147.73 km²), 68.94 km^2 is in good condition and 78.79 km^2 is in unfavourable ('not-good') condition. However, these data are based on a limited dataset with a poor national sample size, collected from only three upland SACs, so data from the last reporting period were also utilised. During the previous reporting period, 59.5% of 4060 habitat was assessed as in good condition and 40.5% in not-good condition (NPWS, 2019). These percentages were applied to the current area of 4060 habitat to derive the maximum area in good condition (87.9 km²) and minimum area in not-good condition (59.83 km²). The minimum area in good condition and maximum area in not-good condition are based on data from the current reporting period. The short-term trend of habitat area in good condition is considered to be *stable*. Although the area of habitat in good condition reported is lower than was reported for the previous reporting period (NPWS, 2019), there is no justification for reporting this as a *decreasing* trend. No resurveying was undertaken of monitoring stops recorded in past reporting periods and there is no overlap in the sites from which habitat condition data were collected between periods. All 4060 habitat assessed as in not-good condition in this reporting period is located in the Wicklow Mountains, while no assessments were carried out in this area in previous reporting periods. Additionally, no assessment data are available for this reporting period from the western seaboard of Ireland, where the majority of 4060 habitat is located, or from areas of 4060 on limestone at lower altitudes in the

	Burren. Therefore, a direct comparison cannot be carried out. The *stable* assessment is based on expert opinion. Of the 15 monitoring stops recorded within the current reporting period, three stops (20%) failed on each of 'number of bryophyte and non-crustose lichen species', 'percentage of live leaves of graminoids showing signs of grazing' and 'browsing of ericoids and *Empetrum nigrum'*. Two stops (13.3%) failed on the criterion 'percentage cover of disturbed bare ground in local vicinity'. Due to the limited coverage of the assessment plots these failures may reflect site-specific issues rather than national trends. As with the Area assessment, the majority of the data informing the Structure and functions assessment were from SACs. The area of 4060 habitat in good condition outside of SACs may be significantly less due to lower levels of protection and scrutiny.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Majority 50-90%	High
PA18 Agricultural activities generating air pollution	Ongoing and likely to be in the future	Whole >90%	High
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Medium
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Medium
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R12976 *Rhododendron ponticum* R03227 *Cervus nippon* R04810 *Dama dama*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Aherne, J., Wilkins, K. & Cathcart, H. (2021) Nitrogen-Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats. EPA Research Report No. 390. McCumiskey House, Richview, Clonskeagh, Dublin 14. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Earthy Matters Environmental Consultants (2019) Repair and Habitat Restoration for Sustainable Access on Errigal Mountain, Co. Donegal, Report to Donegal County Council. European Innovation Partnerships (EIPs) project websites and online publications (where available): Sustainable Uplands Agri-environment Scheme (SUAS) EIP. https://wicklowuplands.ie/suasproject/suas-documents/. Greentrack Environmental Consultants (2024) Dunlewey Rhododendron Survey 2024 Baseline Mapping Report. Report to Cairde na hEaragaile. Hanrahan, S.A. & Sheehy Skeffington, M. (2015) *Arctostaphylos* heath community ecology in the Burren, Western Ireland. *Ecological Questions*, 21, 9-12. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) Annual Fire Reports. Accessed from: https://forest-fire.emergency.copernicus.eu/reports-and-publications/annual-fire-reports. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union, 1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

	NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Personal communications with Senior NPWS staff including NPWS Upland Habitats Ecologist, Regional Managers and District Conservation Officers. Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Site Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. York, C., Aitken, B., McConway, M. & Morris, T. (2019) Cuilcagh Montane Access and Conservation. Proposals for habitat protection on the summit plateau. Report to Ulster Wildlife Trust.
7.4 Additional information *Optional*	Pressures and threats presented in 7.1 were selected and ranked based on intensity (high, medium, low), frequency of occurrence, and area of impact where data were available. EIP project data were only used where the project documentation specifically assigned a pressure or threat to the Annex I habitat or Fossitt (2000) equivalent. There is no national monitoring network for 4060 and data from the current reporting period represent only a small proportion of the data collected on upland habitats to date. Therefore, the pressure and threat data used to inform the previous reporting periods (NPWS 2013b, 2019) were reviewed, with expert judgement applied as necessary to evaluate their continued relevance. PA07 'Intensive grazing or overgrazing by livestock' was identified as a high-influence pressure, in the form of overgrazing by extensively grazing livestock. Overgrazing is widespread across 4060 habitat, especially in stands of 4060 within a peatland context, and results in reduction in species diversity, structural damage and erosion. Grazing was not recorded as a negative impact at either of the NSUH sites containing 4060 habitat surveyed during the current reporting period (Barron *et al.*, 2022; Rigoni *et al.*, 2023), but neither site is representative of the majority of 4060 habitat across the country, with only small areas present in both sites. Of the five sites containing 4060 habitat surveyed by the SUAS EIP (2018-2022) within the Wicklow Mountains (mostly within SAC 002122), overgrazing, primarily by sheep, was identified as having a significant impact on 4060 habitat, resulting in a loss of area at four sites, with a reduction in grazing pressure identified as essential to improve the quality of the habitat. Overgrazing by sheep was noted as a high impact pressure across all areas of 4060 habitat by a survey of a site in the Maamturk Mountains, with areas of *Racomitirum lanuginosum*-dominated grassland, likely to have formerly been 4060 habitat prior to loss of dwarf shrub cover, present (Hodd, 2023). Further evidence collected during previous reporting periods (NPWS, 2013b, 2019) also illustrate the high impact of this pressure on 4060 habitat. PA18 'Agricultural activities generating air pollution' was recorded as a high-importance pressure in NPWS (2019) and was retained as a

	high-influence pressure this reporting period. Analyses indicate that plant species in the habitats 4010, 7130/7130* and 4060 are the most sensitive to total nitrogen deposition (Aherne *et al.*, 2021). PA09 'Burning for agriculture' and PH04 'Vandalism or arson (incl. human-introduced wild fire)' were identified as medium-influence pressures. These pressures can lead to widespread loss and degradation of upland habitats (Perrin *et al.* 2014c). Unregulated burning can reduce plant species diversity and the ericoid component of the vegetation, as well as often causing significant damage to the bryophyte layer. Burning also contributes to peat erosion, desiccation of the habitat and species compositional changes. Burns that are too frequent or severe can result in habitat loss (Glaves *et al.,* 2013). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) annual reports were reviewed. An EFFIS burnt area shapefile for the Republic of Ireland based on MODIS imagery was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped a total of 308 large fire events in the Republic of Ireland covering 18,590 ha. The 4060 habitat polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. These indicate that approximately 46 ha of 4060 habitat were subject to a large burn event this reporting period, across multiple upland areas in Leinster, Munster and Ulster. No burning impact to 4060 habitat was recorded in the two SACs surveyed by the NSUH during the current reporting period. The SUAS EIP recorded burning as a significant impact on 4060 habitat at two sites within the Wicklow Mountains National Park, contributing to area loss of the habitat at these sites. Therefore, although burning was considered to be a low-impact pressure during the previous reporting period, it is deemed more appropriate to regard this as a medium-impact pressure and threat for this habitat in the current reporting period. PF05 'Sports, tourism and leisure activities' is regarded as a medium-level impact on 4060 habitat. This is in the form of erosion caused primarily by trampling by hillwalkers, as well as mountain biking and the use of quad and scrambler bikes. Montane heath is disproportionately impacted by recreational users, as it occurs mainly on the highest ridges and summits, which are typically the focal points of the majority of visitors to the uplands. This impact is usually concentrated in the vicinity of existing paths, where it can be severe, but quickly lessens away from paths, except on the most heavily used mountain summits. During the current reporting period, impacts from recreational users were recorded in 4060 habitat by the NSUH at one site, Ballyhoura Mountains SAC (002036), where 1.3% of the habitat is estimated as having been affected alongside paths. In the Wicklow Mountains, the SUAS project found trampling by hillwalkers to be a widespread impact on 4060 habitat at all five sites containing the habitat, contributing to area loss and habitat degradation. Elsewhere, damage to montane heath by trampling by hillwalkers has been identified on Cuilcagh (York *et al.*, 2019) and Errigal (Earthy Matters

	Environmental Consultants, 2019), both of which are being addressed through path restoration works. PI02 'Other invasive alien species (other than species of Union concern)' is upgraded from low to a medium-influence pressure compared to the previous reporting period. Overgrazing by non-native deer was noted as a significant impact to 4060 habitat across four sites surveyed by the SUAS project in the Wicklow Mountains, leading to vegetation composition and structural changes and erosion. It is difficult to disentangle the impact of deer grazing from sheep grazing in most upland areas, but it is almost certainly having a significant impact on 4060 habitat in the Wicklow Mountains and likely elsewhere, as the deer population is reported to have increased in many areas. Invasive *Rhododendron ponticum* was recorded as an impact on 4060 habitat in the Dunlewey area of Donegal, with 1.06 ha of habitat identified as 4060 being impacted (Greentrack Environmental Consultants, 2024). PD01 'Wind, wave and tidal power (including infrastructure)' was recorded as a low-importance pressure in NPWS (2019) and was retained as a low-influence pressure this reporting period. Wind farms can result in direct habitat loss (e.g. turbine foundations, vehicle access roads, sub-stations) and degradation of the surrounding habitat. Available wind farm data (https://data.gov.ie/dataset/wind-farms-in-ireland) are, in general, provided as a single point for each wind farm development. NPWS (2019) analysis assigned a 2 km buffer to each wind farm point, with this buffer considered representative of the spread of an average upland wind farm development. This 2 km buffer was applied to the wind farm dataset (dated June 2022) with locations of wind farms assessed in relation to the mapped 4060 distribution. A buffer of 1 km was also applied to take account of smaller developments. This review highlighted that 46% of all wind farms are within 2 km of polygons potentially containing 4060 habitat and 38.7% of wind farms within 1 km. A second analysis was conducted to assess wind farms constructed within this reporting period (2019-2022), 48.4% of new wind farms are within 2 km of potential 4060 habitat and 32.3% are within 1 km. However, the majority of 4060 polygons located close to, or containing, windfarm developments are areas mapped as being over 350 m in altitude by NPWS (2007) and almost certainly contain very little, or no, 4060 habitat, as detailed above in section 5.17. Therefore, it is appropriate to retain this as only a low-influence pressure, as very little 4060 habitat is likely to have actually been impacted. PM07 'Natural processes without direct or indirect influence from human activities or climate change', in the form of natural erosion, was recorded during this reporting period from 4060 habitat by the SUAS EIP project at three sites in the Wicklow Mountains and is likely widespread across this habitat. As detailed in section 5.17, some losses of this habitat may have occurred due to landslides. However, PM07 is generally not a major pressure in itself, and acts to exacerbate other existing and historical land use pressures, particularly overgrazing, burning and trampling. Therefore, it is retained as a low-impact pressure.

	Other low influence pressures retained from NPWS (2019), but not recorded as 4060 pressures in the current reporting period are: PA05 'Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)', PE01 'Roads, paths, railroads and related infrastructure', PI03 'Problematic native species' and PM05 'Avalanches, landslides and collapse of terrain'. PA05 is a pressure to the variant of 4060 occurring in the Burren, where cessation of winter grazing has led to encroachment of *Calluna vulgaris* and a transition towards dry heath habitat (Hanrahan & Sheehy Skeffington, 2015). Climate change (particularly PJ01 'Temperature changes and extremes due to climate change' and PJ03 'Changes in precipitation regimes due to climate change') is considered to be a low-importance pressure but a medium-importance threat to 4060, as there is currently little evidence of a significant impact, but there is potential for a higher impact in the future. Predicted increases in frequency of extreme weather events and changes in rainfall patterns may lead to greater erosion (Renou-Wilson & Wilson, 2018). Species compositional change is also a threat in 4060 habitat, with rising temperatures possibly leading to the loss of specialised Arctic-montane species and homogenisation of the vegetation composition, with more competitive species colonising from lower altitudes (Coll *et al.*, 2016; Hodd *et al.*, 2014). Areas in unfavourable condition will be more susceptible to the impacts of climate change. The five high and medium-influence pressures reported in section 7.1, plus climate change, are considered to be the main threats to the 4060 habitat in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)
8.7 Additional information *Optional*	Conservation measures were selected using data gathered from the NSUH (Rigoni *et al*. 2023; Barron *et al.* 2022), NPWS staff, Wild Atlantic Nature (WAN) project, EU INTERREG VA projects, EU LIFE IP projects, EIP-AGRI projects, EU Horizon 2020 projects, Department of Agriculture, Food and the Marine (DAFM) and Coillte. Where ongoing,

	measures listed in NPWS (2019) for 4060 habitat are also included. Very few measures are targeted specifically at 4060 habitat, but many projects with measures targeting upland areas in general or upland peatlands are likely to be having some positive impacts on areas of 4060. Only project that have a demonstrable impact, or are likely to have an impact, on 4060 habitat are mentioned here. Extensive grazing was reported as a neutral impact on 4060 habitat by the NSUH in the Ballyhoura Mountains SAC (002036), suggesting that grazing levels are currently being maintained at a favourable level for this habitat (MA03). A number of locally led European Innovation Partnerships (EIPs) with an upland focus were in operation during this reporting period and have mostly now been succeeded by the broader ACRES CP. Ecologically sustainable grazing was typically a cross-cutting deliverable, with many of these schemes applying results-based habitat condition scoring. Education, awareness-raising and supporting hill farmers were also key features of these schemes. Most of the measures these EIPs focused on were for lower altitude areas, and would have little or no impact on 4060 habitat, but the following EIPs implemented measures with demonstrable or likely relevance to 4060 habitat: - The Sustainable Uplands Agri-environment Scheme (SUAS) (2018-2022) was initiated by the Wicklow Uplands Council and included five commonage areas containing 4060 habitat. Actions targeted at 4060 habitat include: controlled grazing (MA05), cessation of burning (MA06), invasive species (Sika Deer) control (MI03) and control of erosion due to natural (MM01) and human (MF03) causes. - Blackstairs Farming Futures (BFF) Sustainable farming project in the Blackstairs Mountains (2018-2023) did not specifically target 4060 habitat, but the moratorium on burning to reduce the number of farmer-lit fires (MA06) and introduction of sustainable grazing (MA05) would positively impact 4060 habitat across the Blackstairs Mountains. - A Sustainable Agricultural Plan for the MacGillycuddy Reeks - Conservation and restoration of Upland Habitat in the MacGillycuddy Reeks (2018-2021), similarly did not target 4060, but measures implemented to halt burning (MA06) and introduce sustainable grazing levels (MA05) would have an impact beyond the target parcels of land. - Pearl Mussel Project - Farming for nature in a vibrant rural economy (2018-2023) included actions within catchment areas containing 4060 habitat. Introduction of sustainable grazing (MA05) and invasive species control (MI03) may have had some positive impact on 4060 habitat within these catchments. - North Connemara Locally Led Agri-environmental Scheme (2019-2023) operated within the Maumturks and Twelve Bens/Garraun mountain ranges and carried out invasive species control (MI03) that may have positively impacted 4060 habitat. - Comeragh Uplands and Communities EIP Project (2021-2022) operated in the Comeragh Mountains, Co. Waterford and

	included prescribed burning training (MA05) that would reduce the risk of uncontrolled fires that may impact 4060 habitat. The following National Park (NP) measures are included here as they are having, or have the potential to have positive effects on habitat 4060 within these National Parks: - Wicklow Mountains NP is undertaking peatland restoration trials within eroded mountain summit areas where 4060 habitat occurs. At Barnacullian, NPWS staff commenced restoration in 2022. Sheep fencing was erected to exclude grazers (MA06), with heather brash spread to stabilise eroding areas of bare peat (MM01). Lime, fertiliser and grass seed spreading was trialled on the unvegetated surfaces (MM01). Although the actual rewetting of bog habitat is not beneficial for 4060 habitat, the above-mentioned measures to stabilise erosion and exclude sheep is likely to also benefit 4060 habitat. Wicklow Mountains NP staff also undertake efforts on an ongoing basis to towards controlling numbers of invasive Sika Deer (MI03), which graze across these uplands including 4060 habitat. Glenveagh NP controls Red Deer numbers and Connemara NP undertakes Rhododendron control (MI03). Killarney NP undertakes Rhododendron control (MI03) and deer management (MI03 (Sika Deer) and MI05 (Red Deer)). Within the Burren NP, control of the expansion of Hazel scrub and appropriate cattle grazing is undertaken (MA04, MA05). - National Park staff are also typically involved in maintenance of trails to prevent damage to sensitive habitats (MF03), work to reduce illegal fire activity (MA05) and enforce the Ministerial Direction 2010 on the use of All Terrain and Off-Road Vehicles (MF03), which is particularly relevant within Wicklow Mountains NP. Two EU INTERREG VA projects, Cooperation Across Borders for Biodiversity (CABB) and Collaborative Action for the Natura Network (CANN), conducted in this reporting period, were directly connected to the protection and restoration of Natura 2000 sites. 4060 habitat was mapped by the CABB (2017-2022) project within Lough Nillan Bog SAC (000165), so introduction of sustainable grazing (MA05), targeted at improving the condition of blanket bog habitat, would also be beneficial to 4060 habitat. Within CANN (2017-2022), the main relevant restoration actions in Cuilcagh-Anierin Uplands SAC (000584) included the development of a wildfire management strategy (MA05) and path restoration to reduce impacts on sensitive habitats (MF03). The last measure is in response to significant erosion of 4060 habitat by hillwalkers (York *et al*., 2019) and was specifically targeted primarily at 4060 habitat, however its efficacy is unestablished. EU LIFE IP Wild Atlantic Nature (WAN) is a nine-year environmental project (2021-2029) that aims to improve Ireland's performance in conserving habitats, and in particular to improve the conservation status of blanket bog and associated peatland habitats in the project SACs. Though the main focus is on blanket bogs it is anticipated this project will also result, indirectly, in an improvement in the condition of 4060 habitat within the project SACs, through actions such as the

	introduction of sustainable grazing (MA05), via ACRES CP, and through erosion control (MM01). In collaboration with WAN, the WaterLANDS project is undertaking erosion control (MM01) in the Cuilcagh-Anierin Uplands SAC (000584), which may positively impact 4060 habitat. Agri-Climate Rural Environment Scheme (ACRES) is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high priority geographical areas are included under ACRES Co-operation (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. The peatland scorecard is the dominant scorecard used for ACRES CP. It is used on 166,541 ha of private land and 394,836 ha of commonage (Muldowney, 2024). Each peatland scorecard has environmental indicators relating to ecological integrity (e.g. number of positive indicators, cover of bryophytes and lichens, grazing levels etc.), hydrological integrity, and threats and future prospects (e.g. erosion, bare peat, non-native plants, bracken, etc.). Although not targeted specifically, 4060 habitat occurs in many areas covered by ACRES and is likely to be positively impacted by measures implemented under the scheme. Areas of 4060 habitat would occur within the target area of, up to 2022, the Burren Programme, and subsequently, ACRES Burren Aran Islands. Measures arising from these programs and their predecessors would have a benefit to 4060 habitat, particularly through addressing land abandonment (MA04) and introducing sustainable grazing practices (MA05). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) EFFIS annual reports noted that several landowners had financial penalties imposed under farm payment schemes by DAFM within the current reporting period, particularly where burning was found to occur outside of the legally permitted period. There were also incidences where farmers were penalised when fires were permitted to burn overnight from February 28th into the illegal period commencing March 1st (MA06). The impact of trampling by hillwalkers on upland habitats, including 4060, has been addressed at multiple sites across Ireland through path repair and restoration (PF03). Path restoration under the ASCENT Project on Errigal (Earthy Matters Environmental Consultants, 2019) and under the Croagh Patrick Path Project on Croagh Patrick (Lawless, 2021) within 4060 habitat has been carried out during the current reporting period. Additionally, Mountaineering Ireland, the national governing body for hillwalkers and climbers, educates and encourages its members to respect the upland environment, a key part of which is not contributing to erosion of habitats, as well as actively driving and contributing to path restoration works (Mountaineering Ireland, 2013).

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current Range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Current area is approximately equal to the Favourable Reference Area (<2% below FRA). Short-term trend direction of Area is assessed as *uncertain*. However, a number of pressures and threats are expected to continue to have a *negative* influence on area, even with conservation measures in place. Future prospects of Area are therefore *Poor*. Short-term trend direction is *stable* for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A minimum estimate of 40.5% of 4060 habitat is in unfavourable condition. The Conservation Status of Structure and functions is therefore *Unfavourable-Bad*. Future trend of Structure and functions is assessed as *stable*. PA07 and a number of other pressures are expected to continue to have a negative influence on structure and functions, and their impact on the overall status of Structure and functions is not expected to change within the next 12 years. The conservation measures in place either do not specifically target 4060 habitat or only act on a small area of the habitat, so are also not expected to significantly alter the status of Structure and functions at a national scale in the next 12 years. Future prospects of Structure and functions are therefore *Bad*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*

<table>
<tr><td rowspan="9">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td><u>b) yes, due to genuine change</u></td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td><u>d) yes, due to the use of different method</u></td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td><u>e) yes, but nature of change is unknown</u></td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

<u>genuine change</u> / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">The Conservation Status of Range is Favourable in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area is Unfavourable-Inadequate in this reporting period, as it was in the previous reporting period.

The Conservation Status of the Structure and functions and Future prospects are Unfavourable-Bad in this reporting period, as they were in the previous reporting period.

The Overall Conservation Status was assessed as Unfavourable-Bad, as it was during the last reporting period. The status of Unfavourable-Bad during the current reporting period was due to more than 25% of the area of 4060 habitat being assessed as having Unfavourable Structure and functions.

Trend in Overall Conservation Status is assessed as stable for this reporting period. It was assessed as increasing in the previous reporting period, as Structure and functions were deemed to be improving, however, current evidence suggests that these improvements have stabilised.</td></tr>
</table>

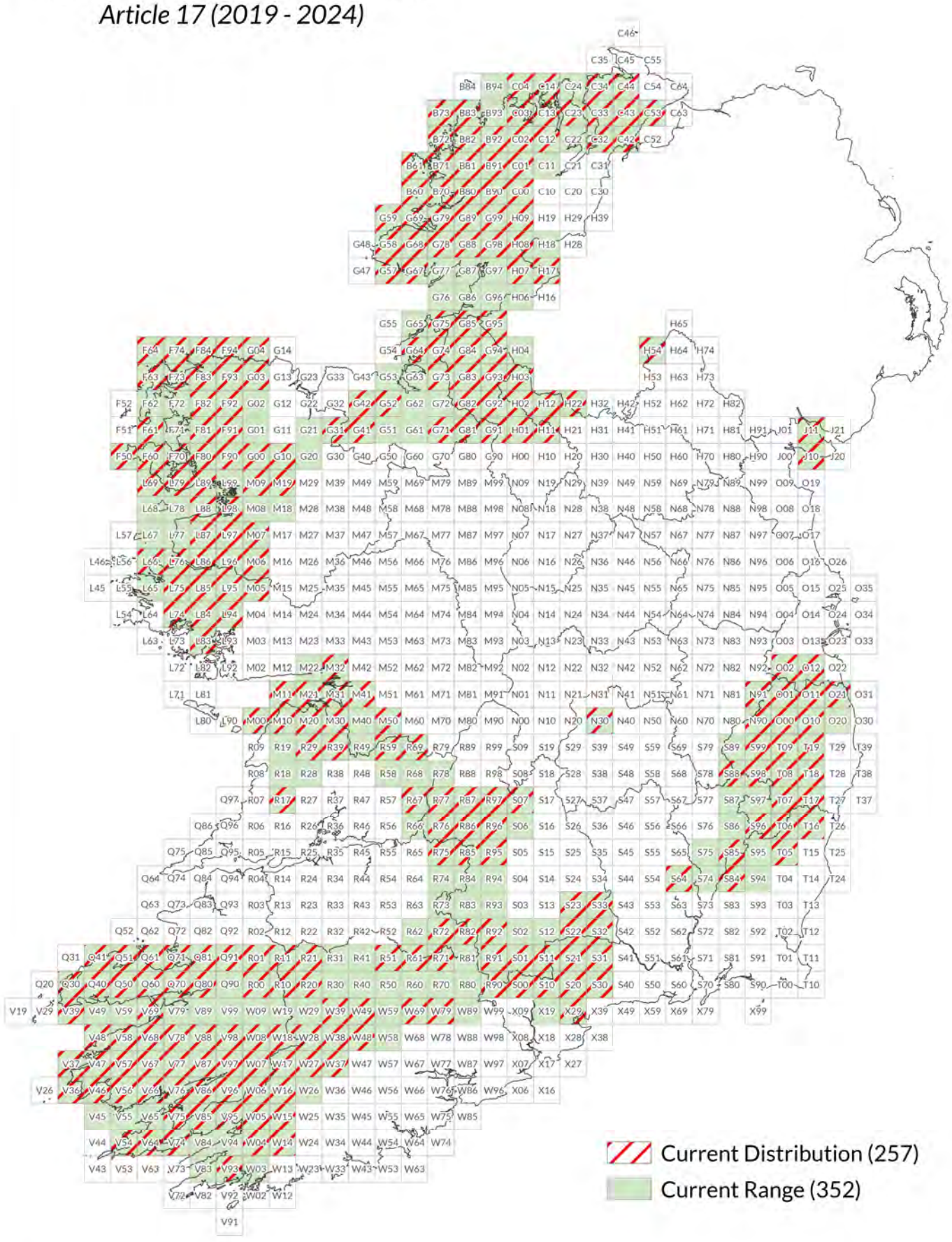
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***107.7 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / decreasing /* ***uncertain****/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the SAC network was estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 4060 habitat in SACs in the country (72.9% of total national area), including SACs where 4060 is not listed as a qualifying interest (QI). The area of 4060 within the Natura 2000 network where 4060 is listed as a QI is 106.95 km^2.	

	The surface area of 4060 habitat within the SAC network has decreased since the last reporting period, primarily as a result of improved knowledge resulting in a refinement of area totals, in addition to smaller recorded area losses. The short-term trend of the 4060 habitat area within the SAC network is taken to be *uncertain*, following the trend of 4060 habitat nationally (section 5.7). The short-term trend of the 4060 habitat in good condition within the SAC network is assumed to be *stable*, the same trend as the 4060 habitat nationally (section 6.4).

12 Complementary information *N/A*

Alpine and subalpine heath (4060)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**5130 *Juniperus communis* formations on heaths or calcareous grasslands**
1.2i Habitat short name	**Juniper scrub**
1.3i Habitat description	In Ireland a Juniper formation is defined as a discrete area supporting 50 or more Juniper plants where no plant is more than 20 m from another. In practice this means that, in addition to reaching the 50-plant threshold, Juniper plants should achieve a minimum density of 25 plants per hectare to qualify as a formation. Juniper formations are mostly associated with lowland dry calcareous and neutral grassland, exposed calcareous rock, dry siliceous heath, exposed siliceous rock and dry calcareous heath; however, formations can also occur on coastal dunes and at higher altitudes (Cooper *et al*., 2012). Both upland and lowland Juniper formations in Ireland are dominated almost exclusively by prostrate or spreading forms of *Juniperus communis*.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled from 5130 polygons digitised for the 2017 Juniper Monitoring Survey (JMS; O'Neill & Martin, 2017), the NPWS 2015 survey (NPWS, 2015), two additional 5130 areas recorded in 2017 (while surveying a different Annex I habitat), O'Brien (2020), Parr & Jeuken (2021), Martin *et al*. (in prep.), the NPWS National Fen Survey 2021 to 2023 dataset (Brophy *et al*., in prep.), and based on data provided by NPWS staff. Data sources that recorded the 5130 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty, often data that have not been validated in the field (e.g.,

	based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 5130 habitat. For all 5130 polygons digitised for the previous round of reporting (NPWS, 2019); 2017 JMS (O'Neill & Martin, 2017), NPWS 2015 survey (NPWS, 2015), plus two additional 5130 areas recorded in 2017, the certainty ratings applied in 2019 were retained. For O'Brien (2020), Parr & Jeuken (2021), Martin *et al*. (in prep.) and the NPWS ranger data, all 5130 polygons were given a certainty of 3 as they were based on ground-truthed surveys. Most of the 5130 polygons from the NPWS National Fen Survey 2021 to 2023 dataset (Brophy *et al*., in prep.) were also given a certainty of 3, as they were based on ground-truthed surveys, but two polygons were assigned a certainty of 2 as they were viewed in the field from a vantage point, and two polygons were given a certainty of 1 as they are based on a desktop survey and remote imagery. All polygons of 5130 from the National Survey of Upland Habitats sites Corraun Plateau SAC (Site code 000485) and Mweelrea / Sheeffry / Erriff Complex SAC (Site code 001932) were removed from the current distribution. This is due to the fact that they contain the vegetation community MH4 *Calluna vulgaris – Juniperus communis* subsp. *nana* montane heath (Perrin *et al*., 2014) that correspond to the EU Annex I Alpine and subalpine heath (4060) rather than the 5130 habitat. These areas have been included within the current 4060 distribution, range and area data. The removal of the Corraun Plateau and Mweelrea / Sheeffry / Erriff Complex from the 5130 distribution has resulted in the removal of four 10x10 km grid cells, L79, L86, L96 and M06, from the current distribution. This change in the distribution, range and area for the 5130 habitat is due to a change in interpretation/methodology rather than an actual change (due to anthropogenic area losses).

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Brophy *et al*., (in prep.) National Fen Survey 2021-2025. Only the 2021-2023 dataset was used for this report. CMP (2025) NPWS Conservation Measures Programme (CMP) 2022-2024. Unpublished data, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. Cooper, F., Stone, R.E., McEvoy, P., Wilkins, T. & Reid, N. (2012) The conservation status of Juniper formations in Ireland. *Irish Wildlife Manuals*, No. 63. National Parks and Wildlife Service, Department

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	Plantlife (2015) The state of Scotland's Juniper in 2015. Report published by Plantlife Scotland. Thomas, P.A., El-Barghathi, M. & Polwart, A. (2007) Biological flora of the British Isles: *Juniperus communis* L. *Journal of Ecology,* 95, 1404–1440. Ward, L.K. & Shellswell, C.H. (2017) Looking after Juniper: Ecology, Conservation and Folklore. Plantlife, Salisbury.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***5,300 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* ***c) the use of a different method*** *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 5,300 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of Juniper formations. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The current range was	

	calculated to be 5,300 km², a reduction from the range of 5,600 km² recorded in NPWS (2019). The change in range is mostly due to a change in interpretation, with upland areas that contain the vegetation community MH4 *Calluna vulgaris – Juniperus communis* subsp. *nana* montane heath (Perrin *et al*., 2014) mapped as the 4060 habitat rather than 5130. This has resulted in the removal of four 10x10 km grid cells, L79, L86, L96 and M06, within the Corraun Plateau and Mweelrea/Sheeffry/Erriff Complex (both in Co. Mayo), from the current 5130 distribution. In addition, some of the change in range is due to four new 10x10 km grid cells where 5130 habitat was recorded during the current reporting period. The new grid cells are M17 (Lough Carra/Mask Complex - Kilkeeran Co. Mayo), R29 (East Burren Complex - Rinnamona North Co. Clare), and R49 (East Burren Complex - Cloonnafunshin Co. Galway), all recorded by the NPWS National Fen Survey 2021 to 2023 (Brophy et al., in prep.), and M21 (East Burren Complex Co. Clare) recorded by O'Brien (2020) and Parr & Jeuken (2021). Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). No actual losses in area, due to either natural processes or anthropogenic impact, that led to range contraction were noted. Trend was assessed as *stable* over the period as the additional four 10x10 km grid cells reported during the current reporting period were probably present in 2013 and 2019 but not recorded. Favourable Reference Range was deemed to be the same as the current range as there is no evidence of decline since the Directive came into force and there is also no reason to assume that the area of the current range is not large enough to allow the long-term survival of the habitat.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2009-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***13.65 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* *b) improved knowledge or more accurate data* ***c) the use of a different method*** *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013 - 2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 2009 when the baseline survey was carried out (Cooper *et al*., 2012) and incorporates updates made by surveys in 2015 (NPWS, 2015) and 2017 (O'Neill & Martin, 2017) and data collected during the current reporting period; O'Brien (2020), Parr & Jeuken (2021), Martin *et al*. (in prep.), the NPWS National Fen Survey 2021 to 2023 dataset (Brophy et al., in prep.), and data provided by NPWS staff. Favourable Reference Area is deemed to be approximately equal to the current area. Some area losses of anthropogenic origin (e.g. road and housing construction) have occurred since the Directive came into force but the current area is considered to be large enough to allow the long-term survival of the habitat. In 2017, 27 potential Juniper formation sites were surveyed to determine if they were still extant formations (O'Neill & Martin, 2017). Some sites contained more than one formation and a total of 82 individual formations were mapped across the 23 sites. These were	

	added to other formations mapped during the baseline Juniper survey (Cooper *et al*., 2012), many of which were resurveyed and remapped as part of an NPWS survey (NPWS, 2015). During the current reporting period, data provided by NPWS staff refined the areas of 5130 habitat at two sites. Data provided by O'Brien (2020), Parr & Jeuken (2021), Martin *et al*. (in prep.), and the NPWS National Fen Survey 2021 to 2023 dataset (Brophy et al., in prep.) added some additional small areas of 5130 habitat and refined the mapping of the 5130 habitat at others. The large difference in habitat extent between this reporting period and the last is primarily due to interpretation, with upland areas that contain the vegetation community MH4 *Calluna vulgaris – Juniperus communis* subsp. *nana* montane heath (Perrin *et al*., 2014) mapped as the 4060 habitat rather than 5130. This has resulted in the removal of polygons within the Corraun Plateau and Mweelrea/Sheeffry/Erriff Complex (both in Co. Mayo), from the current 5130 area. The most significant change was the removal of the Corraun Plateau areas which accounted for 3.90 km² of the 5310 area reported in 2019. The net reduction in 5130 area is 4.04 km² (17.69 km² - 13.65 km²). During the last reporting period two formations located outside the Natura 2000 network were reduced in area by a total of 0.55 ha due to anthropogenic factors (motorway construction and Juniper scrub removal), but at a national level the loss equated to 0.003% per annum in the 12-year period over which these losses were measured, which were considered to be negligible (NPWS, 2019). Losses due to prolonged natural flooding that were also reported in 2019 were ascribed to natural fluctuations (NPWS, 2019). Short-term trend in Area was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). No actual losses in area, due to either natural processes or anthropogenic impact, were reported during the current reporting period. Trend was assessed as *stable* over the period as the additional 5130 areas reported during the current reporting period were probably present in 2013 and 2019 but not recorded.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***12.56 km²***
		Maximum	***12.56 km²***
	b) Area in not-good condition	**Minimum**	***1.09 km²***
		Maximum	***1.09 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	
6.8 Additional information *Optional*	A 5130 Juniper formation in favourable condition is characterised by having a good proportion of fruiting female bushes, evidence of successful seedling formation, or suitable conditions for seedlings to establish (e.g. patches of bare ground or grikes in limestone rock), and generally healthy bushes with few dead or browning individuals and little or no damage from grazing and browsing animals. The habitat should retain any features of local distinctiveness recorded in a previous monitoring period (e.g. presence of Juniper Shield Bug) and should not be subject to high-intensity damaging impacts such as overgrazing, impacts from non-native invasive species, or succession to another habitat such as overtopping scrub (O'Neill & Martin, 2017). During the current monitoring period no new data were available on the structure and functions of the 5130 habitat. In NPWS (2019) the area of 5130 habitat in good condition was estimated based on a total of 82 individual formations mapped across 23 sites, which represents 97% (13.47 km²) of the current 5130 area. Overall, 92% of the surveyed 5130 area was assigned as having *Favourable* Structure and functions (NPWS, 2019). Therefore, in the absence of any new data, the 92% reported in NPWS (2019) is reported again for the current reporting period as it is considered to be broadly representative of the percentage of Structure and functions in *Favourable* condition. Some of the main reasons that areas of 5130 habitat failed the Structure and functions assessment are erosion, perhaps caused by overgrazing or burning, and Juniper scrub removal (NPWS, 2019).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA04 Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.)	Ongoing and likely to be in the future	Minority <50%	Low
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R18201 *Reynoutria japonica* (Japanese knotweed) R12976 *Rhododendron ponticum*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were recorded during 2017 field surveys (O'Neill & Martin, 2017) with additional pressures and threats reported by NPWS staff during the current reporting period.
7.4 Additional information *Optional*	Pressures and threats were ranked based on the NPWS (2019) data gathered during the 2017 Juniper monitoring programme (O'Neill & Martin, 2017). Additional pressures and threats reported by NPWS staff during the current reporting period were also included where relevant. During the last reporting period no pressures were identified as being of high or medium importance nationally (NPWS, 2019). Any high or medium-impact pressures recorded during the last reporting period usually affected only small areas of the habitat, or occurred at a low

	frequency across the sites surveyed and were not considered to be having a significant impact (NPWS, 2019). Pressures listed in NPWS (2019) that had a high impact, but which affected only a small area of the habitat at a local level, include PA04 'Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.)', PA09 'Burning for agriculture', PE01 'Roads, paths, railroads and related infrastructure', PF01 'Conversion from other land uses to built-up areas', and PI02 'Other invasive alien species (other than species of Union concern)'. PI02 was also recorded as a pressure during the current recording period, with *Rhododendron ponticum* impacting the 5130 habitat at Ardnagluggen point within the Kerry National Park (Lyne, 2024) and Japanese Knotweed impacting the 5130 habitat within Barrigone SAC (Site code 000432) Co. Limerick (Mulvihill, pers. comm.). Lyne (2024) also recorded competition/encroachment from native scrub and tree species and grazing by native Red Deer which have been assigned to the pressure PM07 'Natural processes without direct or indirect influence from human activities or climate change'. Pressures listed in NPWS (2019) that affected relatively large areas of the sites where they occurred, but which occurred at a low frequency across the surveyed sites, included PA05 'Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)' and PA07 'Intensive grazing or overgrazing by livestock'. In most cases where grazing was recorded, it was regarded as either beneficial or not damaging to the habitat. The issue of grazing is complex and a balance needs to be maintained between the beneficial effects (e.g. creating bare patches for seedling recruitment and prevention of unwanted scrub encroachment) and the negative effects (such trampling or browsing of developing seedlings). Grazing is discussed in more detail in O'Neill & Martin (2017). Erosion was recorded at several sites but was not listed as a pressure nationally (NPWS, 2019). Juniper formations surveyed in 2017 were seen to persist even in the presence of severe erosion, and Juniper density was often found to be highest in areas where outcropping rock was freely interspersed through bare peat or heathy vegetation. In some cases, the cause of erosion was not clear and could have been either natural (through exposure) or because of past overgrazing. Future monitoring surveys should help to elucidate the long-term impacts of erosion on Juniper formations. Erosion in the context of 5130 habitat is discussed further in O'Neill & Martin (2017). Periodic flooding from turloughs or lakes, which led to the death of Juniper shrubs and some area loss recorded in NPWS (2019), is not listed as an impact. It is difficult to quantify the long-term effect of this occurrence as it is likely to be one that the Juniper habitat has had to adapt to over many decades. Further monitoring and research will be required to determine if such episodic occurrences are damaging or, in fact, ultimately beneficial by invigorating the formation through the creation of seed germination niches and thus promoting seedling recruitment.

	Climate change has not been added as an impact but it could affect the altitudinal and latitudinal range of 5130 in Ireland in decades to come if average temperatures continue to rise (Juniper seed germination is linked to cold temperatures, and Juniper seedlings are susceptible to drought; Thomas *et al.,* 2007).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)
8.7 Additional information *Optional*	Based on expert opinion, the most common conservation measure implemented within the 5130 habitat is appropriate grazing with stock (conservation measure MA03), with schemes such as the NPWS Farm Plan Scheme and the Department of Agriculture's ACRES agri-environment scheme promoting this measure. In the Burren National Park, 80% of the area is grazed under grazing agreements within the ACRES scheme drawn up for the management of Annex I habitats such as 5130; currently only 5.8 ha of 5130 within the Burren National Park. During the current reporting period NPWS staff reported that the conservation measure of wildfire fighting training (MA06) was recorded within the East Burren Complex SAC (CMU, 2025) where 5.35 km² (39% of the current national area) of the 5130 habitat is recorded. This will help counteract pressures such as PA09 'Burning for agriculture'. Conservation measures that are not currently being implemented, but whose implementation would improve the structure and functions of the habitat at the local level, include MI03 'Management, control or eradication of other invasive alien species', particularly invasive species such as *Rhododendron*. Conservation measures such as MI03 can sometimes be addressed by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g., Carra LIFE), and the Department of Agriculture's ACRES agri-environment scheme.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is approximately equal to the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. Future trend of	

	Area is assessed as *stable*, as no change in area is expected. Future prospects of Area are therefore *Good*. Current Structure and functions are assessed as *Favourable* as >90% of habitat is in good condition. Fragmentation or other conditions are not impacting significantly on ecological processes. Short-term trend direction is *stable* (for habitat that is in good condition). Conservation status of Structure and functions is therefore *Favourable*. Future prospects of Structure and functions are therefore *Good*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	Range was assessed as *Favourable*, as in the previous reporting period (NPWS, 2019). As in the previous reporting period, the Favourable Reference Area (FRA) is considered to be approximately equal to the current extent of the habitat. However, the current extent, and therefore the FRA, is different from the previous reporting period (NPWS, 2019). The large difference in habitat extent between this reporting period and the last is primarily due to interpretation, with upland areas that contain the	

	vegetation community MH4 *Calluna vulgaris – Juniperus communis* subsp. *nana* montane heath (Perrin *et al*., 2014) mapped as the 4060 habitat rather than 5130. This has resulted in the removal of polygons within the Corraun Plateau and Mweelrea / Sheeffry / Erriff Complex (both in Co. Mayo) from the current 5130 area. As in the previous reporting period, Structure and functions were assessed as predominantly *Favourable*, with the largest formations assessed by O'Neill & Martin (2017) found to be in good condition. No decline is expected in the immediate future provided the current management regimes remain in place. Therefore, the trend is *stable*. As in the previous reporting period, because Area and Structure and functions were both assessed as *Favourable* and no negative pressures were identified that seriously impacted on the habitat at a national level, the Future prospects of the habitat were also assessed as *Favourable*. Overall Conservation Status of the habitat is therefore assessed as *Favourable*, with a stable trend.

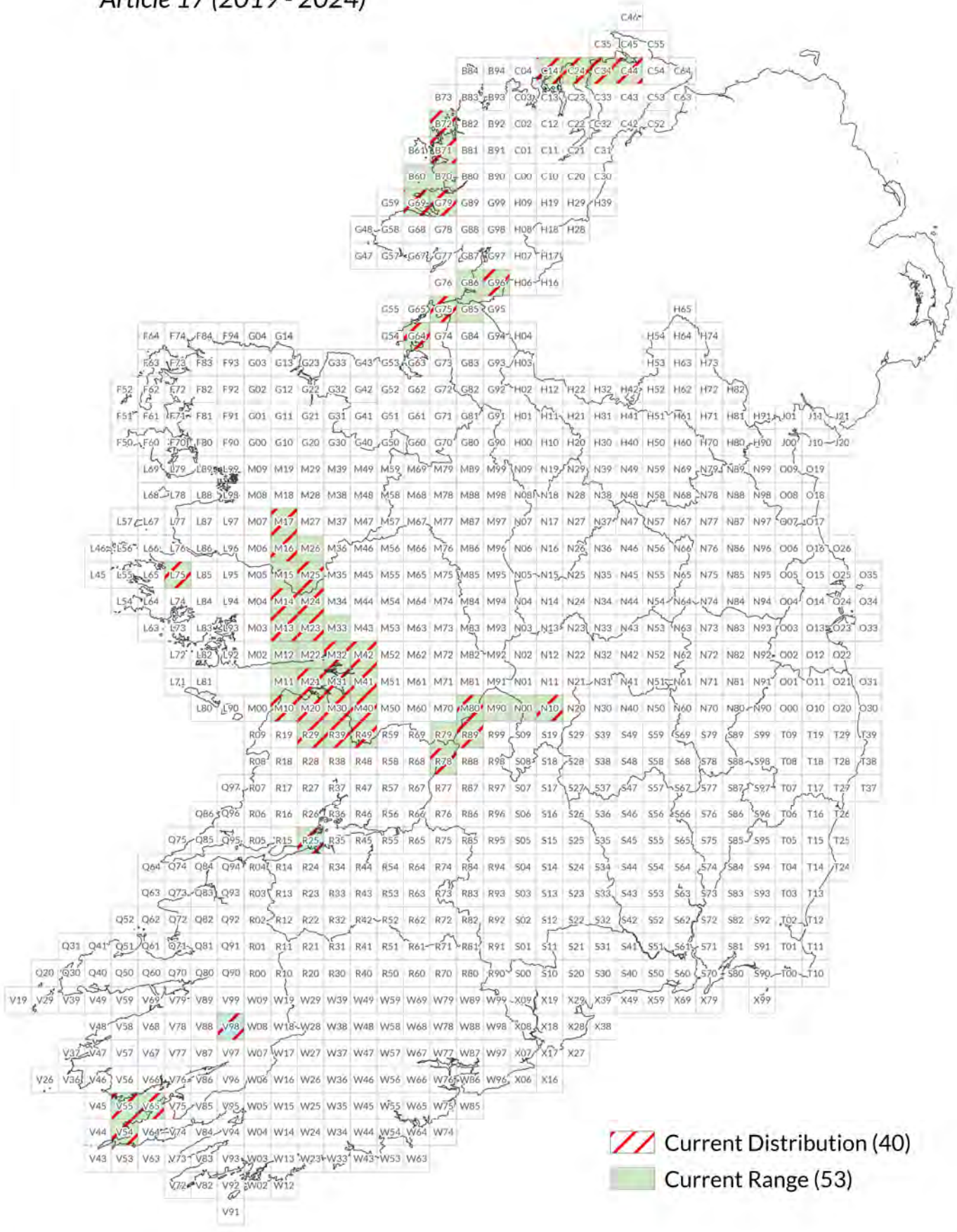
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***11.37 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing a union between the distribution shapefile and the SAC shapefile. The area given in section 11.1 is the total area of 5130 habitat in SACs in the country, including some SACs where 5130 is not listed as a qualifying interest (QI). The area of 5130 within the Natura 2000 network where it is listed as a QI is 9.50 km^2. The area of 5130 habitat within an SAC and where it is listed as a QI has decreased since NPWS (2019) as areas of 5130 from the two uplands sites Corraun Plateau SAC (000485) and Mweelrea / Sheeffry / Erriff Complex SAC (001932) were removed from the current distribution due to a change in methodology/interpretation. There are a number of SACs where 5130 is listed as a QI but the habitat is not mapped as present. These are Moneen Mountain SAC (000054), Glenamoy Bog Complex SAC (000500), Owenduff/Nephin Complex SAC (000534), Ben Bulben, Gleniff and Glenade Complex SAC (000623) and Slyne Head Peninsula SAC (002074). These were not surveyed by O'Neill & Martin (2017), but they were surveyed by Cooper *et al*. (2012) and were found not to contain sufficient Juniper for the habitat to be classed as 5130. The 5130 habitat is also listed as a QI for the Corraun Plateau SAC (000485) and Mweelrea / Sheeffry / Erriff Complex SAC (001932), but as discussed previously the Juniper within these two sites grows within the montane heath community MH4 *Calluna vulgaris – Juniperus communis* subsp. *nana* (Perrin *et al*., 2014) that correspond to the EU Annex I Alpine and subalpine heath (4060) rather than the 5130 habitat.

12 Complementary information *N/A*

Juniper scrub (5130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**6130 Calaminarian grasslands of the *Violetalia calaminariae***
1.2i Habitat short name	**Calaminarian grasslands**
1.3i Habitat description	Calaminarian grassland has a very restricted distribution in Ireland, occurring only on artificial spoil heaps around old mine workings that are contaminated with the heavy metals Cu, Pb and Zn. This habitat is unknown from natural situations in Ireland. It is characterised primarily by the presence of metallophyte bryophytes that are tolerant of high concentrations of heavy metals. These species include *Cephaloziella nicholsonii, C. integerrima, C. massalongoi, Ditrichum cornubicum, D. plumbicola, Scopelophila cataractae* and *Pohlia andalusica*, all of which are rare and threatened in Ireland and Europe. In Ireland, this habitat has very low cover of vascular plants, often being dominated by bare ground, and has few vascular plant indicators. Exceptions include *Minuartia verna* as well as *Armeria maritima* and *Silene uniflora*, when found in inland, lowland sites. This habitat is undergoing a slow, ongoing decline across most sites in Ireland, as the heavy metals are leaching out of the soil over time and vegetation succession, usually to heath, is occurring. The habitat is also vulnerable to reclamation and damage from recreational and other activities, as it is often viewed as waste ground.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2017-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The maps were created from polygons recorded by the survey of Callaghan & Hodd (in prep.) of 20 sites in 2023 and from polygons recorded by Hodd & Hodgetts (2019) for sites not surveyed in 2023.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Callaghan, D.A. & Hodd, R.L. (in prep.) The state of Calaminarian Grassland in Ireland, 2023. *Irish Wildlife Manuals*, No. 1XX. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Campbell, C., Kelly, D. L., Smyth, N., Lockhart, N., Holyoak, D. T. & Long, D. (2023) Investigation of the copper requirements of the metallophyte liverworts *Cephaloziella nicholsonii* Douin and *C. massalongoi* (Spruce) Müll.Frib. *Plants*, 12(12), 2265. Hodd, R. & Hodgetts, N. (2019) Results of a survey to monitor the EU Annex I habitat Calaminarian grassland, 2018. *Irish Wildlife Manuals*, No. 105. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. Holyoak, D. T. (2008) Bryophytes and metallophyte vegetation on metalliferous mine-waste in Ireland. National Parks and Wildlife Service Unpublished Report. Holyoak, D.T. & Lockhart, N.D. (2011) A survey of bryophytes and metallophyte vegetation of metalliferous mine spoil in Ireland. *Journal of the Mining Heritage Trust of Ireland,* 11, 3-16. Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Rare and Threatened Bryophytes of Ireland*. National Museums Northern Ireland, Belfast. Lockhart, N. (2022) Natural Heritage Areas (NHAs) for Calaminarian Grassland: Selection Criteria. *Irish Wildlife Manuals*, No. 130. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***1,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	**10%**
	b) Estimated Maximum	**10%**
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

4.9 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	**10%**
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 2,000 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using ArcToolbox Range Tool, as used in 2013 and 2019. The range consists of 18 10x10 km grid cells, consisting of 15 currently occupied grid cells and a further three grid cells that could potentially support the habitat. Both short-term and long-term trends were assessed as *decreasing*. Since the previous reporting period, one isolated site, 30 Ballyhickey has lost all area of Calaminarian Grassland, resulting in the loss of one 10x10 km grid cell. Another site, 14 Tankardstown, has also lost all area of Calaminarian Grassland since the previous reporting period, but as there are two other extant sites within the same grid cell, this does not impact the range. Between the initial survey of Holyoak	

	(2008) and the survey of Hodd & Holyoak (2019), a further site, 27 Lackamore, was also lost due to land reclamation. The Favourable Reference Range (FRR) was derived from the survey of Holyoak (2008), which is considered to be the baseline survey of Calaminarian Grassland in Ireland. The current range calculated indicates a contraction from 20 cells to 18 cells. This is due to the loss of the above-mentioned two geographically isolated sites, which were both small in area and of low conservation importance. Therefore, there is a 5.5% decrease in range since the last reporting period and a 10% decrease from the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2017-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.06166 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	

5.7 Short-term trend Direction	*stable / increasing / **decreasing** / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***1.9%***
	b) Estimated Maximum	***6.8%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate** / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 0.06286 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The area was calculated based on a 2023 survey (Callaghan & Hodd, in prep.) of 20 sites out of the 29 known Calaminarian Grassland sites in Ireland. The nine sites that were not surveyed in 2023 were assessed as in favourable condition since the baseline surveys, and in the last two reporting rounds (2013, 2019), with no evidence of significant decline, and were presumed to be unchanged in area. As was reported in 2018, there may be up to 2 ha of additional unsurveyed Calaminarian Grassland in Counties Wicklow and Cork, but this has not been confirmed, so is not included in the area reported. The results of surveys in 2018 are used here to determine trend because they are considered to be the first comprehensive and accurate survey of the known extent of 6130 in Ireland. The short-term trend period is therefore, on this occasion, equal to the reporting period. Although a loss in area of 0.12 ha was recorded at the sites surveyed in 2023, the total area calculated is only 0.0001% smaller than that calculated during the previous reporting period. This is due to additional areas being recorded at multiple sites, that were not recorded during the previous survey. Therefore, the actual area present during the previous reporting period is considered to be the area reported in 2019 plus the additional areas recorded in 2023, which indicates a minimum decline of 1.9%. The actual loss in area recorded at the sites surveyed in 2023 is 6.8%, which can be taken as the estimated maximum decline over the reporting period. It is not known whether this rate of loss can be applied also to the sites that were not surveyed in 2023, particularly as those sites were not selected for survey as they were considered to be in good condition during the previous monitoring survey, so would be expected to show a slower rate of loss. However, all evidence available indicates that a gradual loss of area is occurring across all sites, due primarily to vegetation succession as heavy metals are leached from the substrate. This includes the loss of the entire area of habitat at two small sites (14 Tankardstown and 30 Ballyhickey), with a third site (27 Lackamore) lost during the previous monitoring period. A further 12 sites exhibit a loss in area of varying magnitudes since 2018. Therefore, it can be said with a high level of confidence that the trend in area of Calaminarian Grassland in Ireland is *decreasing*, with the rate of decrease likely to be between 1.9% and 6.8% over the current reporting period. It is likely that the actual decline over the reporting period is closer to the minimum estimated value reported than the maximum, as the sites	

	not resurveyed in 2023 were assessed as being in relatively better condition in 2018 than those that were resurveyed, so would be expected to show a slower rate of decline than the 2023 survey sites. Favourable Reference Area (FRA) was taken to be the total area reported in the previous reporting period plus the additional areas recorded in 2023, which would have been present when the Directive came into force and were overlooked during the 2018 survey. The current area reported here is 1.9% less than the FRA and is not considered sufficient to enable the long-term survival of the habitat. Given the slow decline assumed at Calaminarian Grassland sites associated with historic mining activities and the documented changes since 2018, the short-term trend for Area is assessed as *decreasing*.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.0472 km²***
		Maximum	***0.0472 km²***
	b) Area in not-good condition	**Minimum**	***0.0145 km²***
		Maximum	***0.0145 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		

6.7 Typical species Method used *Optional*	The list of typical species is mostly unchanged from the previous reporting period, and is based mainly on the list produced by Holyoak (2008), i.e. rare metallophyte bryophytes (*Cephaloziella nicholsonii, C. integerrima, C. massalongoi, Ditrichum cornubicum, D. plumbicola, Scopelophila cataractae* and *Pohlia andalusica*) and some vascular plants: *Minuartia verna*, which grows at one Calaminarian Grassland site in Ireland, and inland, lowland stands of *Armeria maritima* and *Silene uniflora*. One additional indicator species, the moss *Microbryum starckeanum*, which was considered to be Regionally Extinct in Ireland, was discovered at site 31 Sheshodonnell East during the 2023 survey (Callaghan, in prep.). Although this species is a facultative, rather than an obligate metallophyte, it can be considered as indicative of Calaminarian Grassland in Ireland, so is included in the category 'Other bryophytes' on the list of indicator species. This addition does not have any impact on the overall site assessment methodology.
6.8 Additional information *Optional*	The Structure and functions of 19 sites containing Calaminarian Grassland was assessed in 2023 (Callaghan & Hodd, in prep.), out of a total of 29 known sites. These sites were selected as those that were assessed as being in poor condition or threatened during the previous reporting period by Hodd & Hodgetts (2018). The condition of the sites not surveyed during this reporting period was assumed to be unchanged. Structure and functions were assessed based on number of indicator species, vegetation encroachment and human impacts. Presence or absence of indicator species, especially rare metallophyte species, was not considered a strong indicator of habitat condition, due to the species-poor nature of this habitat in Ireland and difficulty in locating and definitively identifying some of the specialist bryophyte species. Therefore, the presence of only one positive indicator species was required to pass the assessment, and failure to refind records of rare metallophyte species was not automatically taken as an indicator of a decline in the quality of a site, without additional evidence of decline. The criterion for vegetation encroachment was modified slightly from the previous reporting period, where scrub encroachment was assessed, to take all encroaching vegetation into account. Of the 19 sites surveyed in 2023, the Structure and functions of 14 were assessed as *Favourable*, four as *Unfavourable-Inadequate* and one as *Unfavourable-Bad*. In the previous reporting period, the Structure and functions of 15 sites were assessed as *Unfavourable-Inadequate*, with the remainder assessed as *Favourable*. This increase in the number of sites assessed as having *Favourable* structure and functions may reflect some genuine minor improvements in habitat quality, such as lack of dumping of rubbish at sites where dumping was previously recorded, but may also reflect differences in approach by surveyors between the survey periods. Area in good condition was calculated based on the percentage of Calaminarian Grassland habitat at each site assessed as being in good or bad condition by the survey of Hodd & Hodgetts (2018), as these areas were not recalculated during the 2023 survey. Although the overall area of Calaminarian Grassland habitat has decreased, the area

	of habitat in good condition has increased slightly due to additional areas of Calaminarian Grassland being recorded at sites that were assessed as being in mostly good condition. However, this is likely an artefact of methodological differences, rather than reflecting a genuine change of habitat from poor to good condition. A total of 76.5% of the area is assessed as being in good condition and 23.5% is assessed as being in poor condition. Based on the data available, the trend in area of habitat in good condition is assessed as *stable*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Whole >90%	High
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R11650 *Pinus sylvestris*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were recorded by the field survey in 2023 (Callaghan & Hodd, in prep.) of a subset of sites that were evaluated as being in poor condition during the previous monitoring period.
7.4 Additional information *Optional*	The most widespread pressure, recorded across 19 of the 20 sites surveyed in 2023, was PM07 'Natural processes without direct or indirect influence from human activities or climate change'. This can also be considered to be an ongoing threat at all of these sites. Although no data on pressures exist from the sites not surveyed during this monitoring period, a high degree of certainty exists that it is also an ongoing pressure and threat at the majority of those sites. As the concentration of heavy metals in the mine spoil decreases over time, vegetation succession is slowly taking place and scrub and grassland is encroaching upon the habitat. Two sites (14 Tankardstown and 30 Ballyhickey), that only contained small marginal areas of Calaminarian Grassland during the previous reporting period (Hodd & Hodgetts, 2018) have lost the entire area of Calaminarian Grassland present due to vegetation succession in the past 6 years

	(Callaghan & Hodd, in prep.). Most other sites have decreased in area due to successional impacts, to varying degrees. Populations of rare bryophyte species have also been lost and diminished, or are under threat, due to encroachment of vegetation. Natural erosion of the habitat, which was listed under a separate pressure code to vegetation succession during the previous reporting period, is also included within this category, and is also ongoing at the majority of sites. Other pressures are only active at a subset of sites. The pressure PI02 'Other invasive alien species (other than species of Union concern)' was identified as both a pressure and threat at four sites, and in all cases refers to the deposition of needle litter from planted *Pinus sylvestris* adjacent to the Calaminarian Grassland habitat. At two sites, 02 Ballycorus and 19 Ross Island, a negative impact was noted on populations of the rare characteristic metallophyte species *Ditrichum plumbicola* and *Cephaloziella massalongoi*, respectively. PF05 'Sports, tourism and leisure activities' is negatively impacting a number of sites, with a high impact recorded at two sites, 09 Ballinafunshoge and 23 Dooneen, in the form of offroad driving and trampling, respectively. Other pressures and threats to this habitat are minor and only impact a small number of sites. These include PA01 'Conversion into agricultural land (excluding drainage and burning)', which resulted in the loss of one site, 27 Lackamore, during the previous reporting period, and PF02 'Construction or modification (e.g. of housing and settlements) in existing built-up areas', which refers to the capping of mine spoil to prevent pollution of the adjacent Avoca River at site 08 Tigroney West, where a very small fragmentary area of Calaminarian Grassland now remains.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	To date, the only measure taken is MM01 'Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change', which applies to only a very small area (ca. 0.05 ha) of site 20 Allihies (Mountain mine), within the Kenmare River SAC. This is in the form of targeted habitat restoration at the only location in Ireland where the globally rare moss *Ditrichum cornubicum* occurs. The small-scale works consist of scraping back and removing the top layer of vegetation and spoil, where vegetation succession and leaching out of heavy metals has occurred, in the vicinity of the known locations of *D. cornubicum*. This work is ongoing and requires further monitoring of its impact, but early indications are that the population of *D. cornubicum* is expanding at this location, at least partially due to the conservation measure taken. This measure is the key measure that is required across most sites containing Calaminarian Grassland in Ireland, particularly those containing populations of rare bryophytes, in order to reverse the gradual reduction in range, area and quality of this habitat resulting from natural succession.

	Three further conservation measures were noted by Callaghan & Hodd (in prep.) as being required at multiple sites. These are MA03 'Maintain existing extensive agricultural practices and agricultural landscape features', MI03 'Management, control or eradication of other invasive alien species' and MF03 'Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)'. These measures would address the main pressures and threats outlined in section 7.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / **Poor** / Bad / Unknown*
	c) Structure and functions	*Good / **Poor** / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *decreasing*. Current range is less than the Favourable Reference Range. Conservation status of Range is therefore *Unfavourable-Inadequate*. Future trend of Range is assessed as *negative*, as range is expected to continue to contract based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Poor*. Short-term trend direction of Area is assessed as *decreasing*. Current area is less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative*, as a continued decline in area is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Area are therefore *Poor*. Current Structure and functions are assessed as *Unfavourable-Inadequate* because the area of habitat in unfavourable (not-good) condition is 23.5% (i.e. less than 25%) and the area of habitat in good condition is 76.5% (i.e. less than 90%). Short-term trend direction for habitat in good condition is *stable*. Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*

10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The conservation status of Calaminarian Grassland is unchanged from the previous reporting period, with a continuing deteriorating trend. Range continues to decline, due to the loss of one geographically isolated site, and decline in area is ongoing. The rate of decline of area is unclear, with the data indicating that is likely to be slow and steady. Habitat structure and functions show a stable trend, with little evidence for decline, but overall habitat quality and area in good condition is poor. Future prospects are poor across all parameters. Conservation measures are required across all sites that contain important populations of rare bryophytes, to slow and reverse the decline in heavy metal toxicity and the resulting succession to other habitats. This has been applied, with some success, at site 20 Allihies (Mountain Mine), where the population of the globally rare moss *Ditrichum cornubicum* has increased due to targeted exposure of suitable heavy-metal rich substrate. If this approach is not applied at further sites, the deteriorating trend of this habitat will continue across future reporting periods and its conservation status will further decline.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

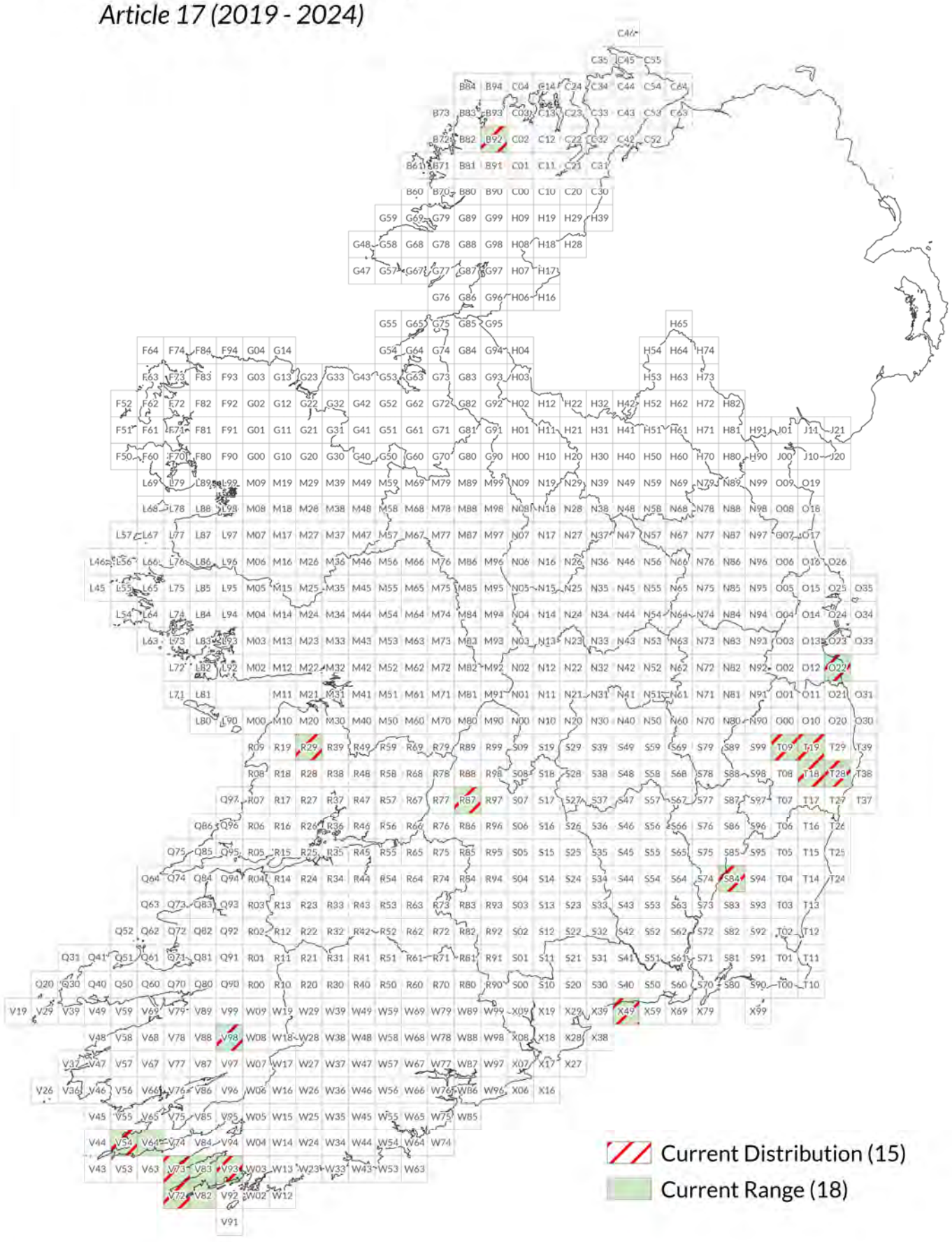
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.034438 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	

11.3 Surface area of the habitat type inside the network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution shapefile and the SAC shapefile. Calaminarian Grassland occurs within six SACs, of which it is a QI for five, and only a small area of low conservation value habitat occurring within the SAC for which it is not a QI. An estimated 55.9% of the national area of Calaminarian Grassland is located within the SAC network. The area of habitat within the SAC network is assessed as *stable*, with a very small, non-significant, increase in area reported. 82% of Calaminarian grassland within SACs is inferred to be in good condition and the short-term trend in habitat area in good condition within the network is assessed as *stable*, as no change is apparent since the previous reporting period.

12 Complementary information *N/A*

Calaminarian grasslands (6130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)**
1.2i Habitat short name	**Orchid-rich calcareous grassland***
1.3i Habitat description	The Annex I habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) comprises species-rich plant communities found on shallow, well-drained calcareous substrates. It is considered a priority habitat only if it is an important orchid site, which in Ireland refers to sites that have any native orchid species other than the relatively common *Dactylorhiza fuchsii* and *Dactylorhiza maculata*. This habitat includes a mixture of grasses and herbs, with calcicole species typically frequent. It often occurs on obvious geological features such as eskers, outcropping limestone rock and in association with limestone pavement. The Burren (Clare/Galway) and Dartry Mountains (Sligo/Leitrim) are particularly important areas within the State for this Annex I habitat, but it can also be found scattered across much of the midlands. The 6210 habitat is comprised of a diverse group of plant communities belonging to the Bromion-erecti, including GL3A *Briza media – Thymus polytrichus* grassland (Perrin, 2021) and CG1/CG2 (Rodwell, 1992).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2004-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map for 6210 or orchid-rich *6210 habitat (referred to as 6210/*6210 for the remainder of the document) in Ireland was developed using the Article 17 distribution map for 2013-2018 as a starting point. Thus, all data sources listed in section 2.5i of the 2013-2018 Article 17 report (NPWS, 2019) were initially included. This map was amended in 2024 to incorporate updates from surveys carried out in the current monitoring period. This primarily affected the polygons from the 2015-17 Grassland Monitoring Survey (GMS15-17; Martin *et*

	al., 2018) and 2007-12 Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.*, 2013), because a subset of these were revisited as part of the Grassland Monitoring Survey of 2021-23 (GMS21-23). Further new data came from the Pilot Fen Survey of 2019-2020 (O'Neill *et al.*, 2023) and the National Fen Survey (2021-2023 data) (Brophy *et al.*, in prep.), and from a number of other sources such as the NPWS Farm Plan Grassland Monitoring project (Delaney & Owens, 2021). Polygons in the 2013-2018 Article 17 distribution file from Tubridy & Meehan (2006), Dwyer *et al.* (2007), Hickey & Tubridy (2008), Muyllaert & Jennings (2009), Perrin *et al.* (2011), Perrin *et al.* (2013a), Perrin *et al.* (2013b), Wilson & Valverde (2013), O'Neill & Martin (2015) and Galway County Council (2017) were included if they were not superseded by later data. The distribution map also utilised points digitised from NPWS (2004), Conaghan & Fuller (2005), Conaghan *et al.* (2006), Reynolds *et al.* (2006), Moran (2007), Parr *et al.* (2009), Long (2011), Browne (2019) and relevés in the National Vegetation Database held by the National Biodiversity Data Centre (NBDC). Linear areas of 6210 habitat digitised by Roche (2013) were determined by aerial image review to have been lost due to construction of a greenway cycle path and were removed from the distribution map. A certainty rating was assigned to mapped polygons and points, with a range of 3 to 1 from high to low certainty (corresponding to definitely/ probably/possibly 6210/*6210). Recent data sources (10 years old or less) listed in section 3.4 recorded by experienced ecologists, and where the habitat was visited, were assigned a high certainty=3. These are accepted as being the 6210/*6210 habitat. No dataset over 10 years old was assigned a certainty=3, as there is a possibility that the grassland habitat recorded over 10 years ago may not still be present. Data sources where the habitat was confirmed but 10-20 years have elapsed since the surveys, or more recent surveys where the habitat was viewed from a distance rather than walked, were assigned a lower certainty=2. Older data sources (more than 20 years old) that possibly include the 6210/*6210 habitat were assigned a low certainty=1. All data sources with a certainty of 1 to 3 were used to map the distribution of the 6210/*6210 habitat and, from this, to derive the habitat's range. As detailed in NPWS (2013), grassland relevés collected by Austin O'Sullivan between 1962 and 1972 and digitised by Bourke *et al.* (2007) were also analysed against the 6210/*6210 Structure and functions criteria utilised by O'Neill *et al.* (2013) and 68 of the 2,067 relevés were considered to represent the 6210/*6210 habitat. As the O'Sullivan data are over 50 years old, they were not utilised in calculating the current area or current range of the Annex I habitat, but they were used to help inform the Favourable reference range.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated since the 2013-2018 Article 17 report (NPWS, 2019):** Brophy *et al*. (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P. J. (2023) County Leitrim Wetlands Field Survey II 2023. Report prepared for Leitrim County Council. Delaney, E. & Owens, J. (2021) Assessment and Monitoring of Annex I Grasslands at NPWS Farm Plan Sites. Report prepared for National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. JBA (2023) Survey of Three Parks in South Dublin County for quality of semi-natural grasslands and pollinators 2022. Report prepared for South Dublin County Council. Keep Kilkenny Beautiful (2022) Kilkenny City and Environs Grassland Inventory. Unpublished Report. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2023) Floodplain and Callows Grasslands in Ireland. *Irish Wildlife Manuals*, No. 144. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Martin, J.R., O'Neill, F.H., Daly, O.H., Devaney, F.M. & Woods, K.M.S. (in prep.) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats 2021-2023. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. O'Brien, P. (2022) Castlesampson Botanical Surveys. Unpublished report to National Parks and Wildlife Service. O'Brien, P. (2020) Burren assessment data project. Unpublished report for NPWS. O'Neill, F.H., Perrin, P.M., Denyer, J., Martin, J.R., Brophy, J.T. & Daly, O.H. (2023) Scoping study and pilot survey of fens. *Irish Wildlife Manuals*, No. 143. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Parr, S. & Jeuken, N. (2021) Linking Burren data project. Unpublished report for NPWS.

	All datasets checked for the 2019 Article 17 report are also relevant, and these are listed below: Bourke, D., Hochstrasser, T., Nolan, S. & Schulte, R. (2007) Historical Grassland Turboveg Database Project: 2067 Relevés Recorded by Austin O'Sullivan 1962-1982. Database reference Nos: 25604-28543. Unpublished report for the National Parks and Wildlife Service, Dublin. Browne, A. (2019) AranLIFE project – unpublished data. Conaghan, J. & Fuller, J. (2005) A Survey of Rare and Threatened Vascular Plants in County Leitrim. Unpublished Report for the National Parks and Wildlife Service, Dublin. Conaghan, J., Roden, C. & Fuller, J. (2006) A Survey of Rare and Scarce Vascular Plants in County Galway. Volumes 1, 2 and 3. Unpublished Report for the National Parks and Wildlife Service, Dublin. Curtis, T. & Wilson, F. (2014) Orchid Ireland Survey 2014. Report prepared for the National Museum and Galleries of Northern Ireland. Dwyer, R., Crowley, W. & Wilson, F. (2007) Grassland Monitoring Project 2006. Unpublished Report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Hickey, B. & Tubridy, M. (2008) Laois Habitats Survey 2008. Part I: Survey Report and Results. Report prepared for Laois Heritage Forum: An action of the Laois Heritage Plan 2007-2011. Heritage Council and Laois County Council. Ireland. Long, M. P. (2011). Plant and snail communities in three habitat types in a limestone landscape in the west of Ireland, and the effects of exclusion of large grazing animals. PhD Thesis, Botany Department, Trinity College, Dublin. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Moran, J. (2007) Unpublished relevés from The Burren Co. Clare of Winterages as part of the BurrenLIFE Project, Clare. Muyllaert, M. & Jennings, R. (2009) Heritage Audit of the Northern River Nore. An action of the draft Kilkenny Heritage Plan 2007-2011. Volume 3 National Heritage. Heritage Council, Kilkenny. NPWS (2004) Coole-Garryland Complex SAC (000252) Site Synopsis. National Parks and Wildlife Service, Dublin. O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. *Irish Wildlife Manuals*, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. O'Neill, F.H. & Martin, J.R. (2015) Summary of findings from the Survey of Potential Turloughs 2015. Volume I: Main Report.

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Parr, S., O'Donovan, G., Ward S. & Finn, J. A. (2009) Vegetation Analyses of Upland Burren Grasslands of Conservation Interest. *Biology and Environment: Proceedings of the Royal Irish Academy*, 109B, 11-33.

Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats, Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932) Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

Perrin, P.M., Roche, J.R. & Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. and Leyden, K.J. (2013a) National Survey of Upland Habitats, Site Report No. 12: Arroo Mountain SAC (001403), Co. Leitrim. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

Perrin, P.M., Roche, J.R. & Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. and Leyden, K.J. (2013b) National Survey of Upland Habitats, Site Report No. 11: Ben Bulben, Gleniff and Glenade Complex cSAC (000623), Cos. Leitrim and Sligo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

Perrin, P.M. (2021) Irish Vegetation Classification: Community synopsis *Briza media -Thymus polytrichus* grassland v2.0. https://biodiversityireland.ie/projects/ivc-classification-explorer/ Accessed 18/11/2024.

Reynolds, S., Conaghan, J. & Fuller, J. (2006) A Survey of Rare and Scarce Vascular Plants in County Limerick. Unpublished Report for the National Parks and Wildlife Service, Dublin.

Roche, J. (2013) Athlone to Mullingar Cycleway Habitat Survey. Unpublished Report by BEC Consultants Ltd., Dublin.

Tubridy, M. & Meehan, R. (2006) County Offaly Esker Survey 2006. Report for Offaly County Council and Heritage Council, Kilkenny.

Wilson, S. & Valverde, F. (2013) National Survey of Limestone Pavement and Associated Habitats in Ireland. *Irish Wildlife Manuals*, No. 73. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

Miscellaneous sources:

Digitised polygons near Killeglan SAC were provided by a third party.

The following were also referenced in this report:

Anon. (2020) National Parks and Wildlife Service Farm Plan Scheme, Terms and Conditions Document. Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland. National Parks and Wildlife Service.

DAFM (2020) European Innovation Partnership Scheme. https://www.gov.ie/en/service/18a855-european-innovation-partnership-scheme/. Accessed 25/11/2024.

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4 Range

Range within the biogeographical/marine region concerned	
4.1 Surface area	***23,400 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*
4.3 Short-term trend Period	***2013-2024***
4.4 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*

4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***2.5%***
	b) Estimated Maximum	***2.5%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	Select one of the following methods: a) Complete survey or a statistically robust estimate **b) Based mainly on extrapolation from a limited amount of data** c) Based mainly on expert opinion with very limited data d) Insufficient or no data available	
4.12 Favourable reference range	***a) 24,000 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:*

		high/moderate/low
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Current range was calculated using the range tool, based on the current known distribution of the 6210/*6210 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The figure in 4.1 is a minimum, as further unmapped areas of 6210 are likely to occur. Short-term trend was estimated based on data from the current reporting period and the previous reporting period. No decrease in range was reported between 2013 and 2018 (NPWS, 2019). The 2013 monitoring report noted that there was some evidence of a minor reduction in the south-western edge of the range of 6210 over the previous 50 years, based on historical data from O'Sullivan (1982), but overall, the range was assessed as stable since the Directive came into force. A similar finding was made in NPWS (2019), with no evidence of a decline in range since the Directive came into force. However, genuine losses due to anthropogenic actions were recorded during the current reporting period at the edge of the range in Roscommon and Galway (see section 5.17 for further details), causing a decrease in the range of six 10x10 km grid cells. This is a 2.5% loss in range, equivalent to a per-annum decrease of 0.21%, since 2013. The Favourable Reference Range (FRR) given in 4.12 (a) is the current range plus the six additional 10x10 km grid cells lost during the current monitoring period. The current range is calculated as being 2.5% below the FRR. Any increases in the range noted since 2013 are assumed to be due to increased knowledge rather than habitat increase. While there were some increases noted, these were mostly, if not all, adjacent or within existing sites with 6210 already mapped.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2004-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***19.34 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	

5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***20%***
	b) Estimated Maximum	***20%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>5.12 Long-term trend Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ <u>between 11% and 25% smaller than the FRA</u>
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 2004 and incorporates updates made during the last reporting period (NPWS, 2019) and surveys that have taken place during the current reporting period: Grassland Monitoring Survey (GMS) of 2021-23 (Martin et al., in prep.), Pilot Fen Survey of 2019-2020 (O'Neill et al., 2023), National Fen Survey (Brophy et al., in prep.; 2021-2023 data – project ongoing), data from studies in the Burren (O'Brien, 2020; Parr & Jeuken, 2021) and from a number of other sources such as NPWS Farm Plans Grassland Monitoring Project (Delaney & Owens, 2021), Floodplain</td></tr>
</table>

	grassland study (Martin *et al*., 2023), Keep Kilkenny Beautiful grassland inventory (KKB, 2022), County Council surveys of urban grasslands (JBA, 2023) and Leitrim County Council Wetlands Survey (Crushell *et al*., 2023). There are probably still areas of unmapped 6210/*6210 habitat within the country, particularly within the Burren (Clare/Galway), hence the area value entered is a minimum. Favourable Reference Area was not determined exactly. However, it is deemed to be more than 10% but less than 25% greater than the current area, given that anthropogenic losses have occurred since the Directive came into force. Subsequent increases in area have not offset these losses. Losses continue to occur. The 2021-23 GMS visited 54 of the 137 sites that had been previously surveyed for 6210/*6210 by the 2007-12 Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al*., 2013), plus an additional three sites that were surveyed in 2006 (Dwyer *et al*., 2006). At 28 of the 57 surveyed sites, areas of 6210/*6210 had been lost due to impacts such as agricultural intensification and undergrazing or abandonment. The total recorded area of 6210/*6210 lost to impacts such as agricultural improvement was 65.11 ha, which represents 20% of the original area mapped by the baseline surveys at these sites. At three of the sites, over 95% of the Annex I habitat was lost. Two of the sites had been agriculturally improved to the extent that no further survey work was undertaken there. The remaining 55 sites were surveyed to determine the extant area of 6210/*6210 and to monitor the structure and functions. The increase in reported area is mainly due to improved knowledge. There have been measurable losses of 6210 habitat since the last reporting period that have not been offset by sufficiently large increases. Short-term trend in Area was deemed to be *decreasing* in this monitoring period because the area of 6210/*6210 had been reduced at 28 of the 57 surveyed sites due to anthropogenic factors, such as agricultural intensification. The short-term trend was also reported as *decreasing* in the previous monitoring period. The magnitude of the known loss, measured over a period of 12 years between this monitoring period and the baseline (two monitoring periods), is approximately 1.66% per annum, calculated by estimating the area lost and expressing this as a per-annum percentage of the original area. At seven sites, genuine increases in the area of 6210/*6210 were recorded, but these increases are small when compared to the overall loss. Therefore, taking all of these points into consideration, the short-term trend direction is taken to be *decreasing*. For the linear 6210 habitat (adjacent to a canal) recorded in the 2019 monitoring report (NPWS, 2019), aerial imagery was reviewed and the entire combined length of the polyline, amounting to 2,450 m, was deemed to have been lost due to construction of a cycleway. Assuming a width of 3 m to calculate the area, this represents a loss of 7,353 m^2 of habitat. These area losses are taken to be the minimum, with other undocumented losses likely to have taken place in sites not surveyed since the previous monitoring period. Also, as monitoring for the current

	reporting period generally focused on 'primary areas' of Annex I grassland (i.e., those areas representing the best examples of the 6210/*6210 habitat), as recommended by O'Neill *et al*. (2013), it is likely that losses may be higher in more marginal sites. Extrapolating up to the national resource of the habitat, with the calculation based on the current area of 19.34 km^2, a 20% loss in area since the baseline would correspond to an area loss of 3.87 km^2 of 6210/*6210 habitat in the 12 years since 2013. The difference in habitat extent between this reporting period and the last is primarily due to more accurate data, with additional areas of 6210/*6210 habitat recorded in surveys for other purposes, such as fen surveys and farm plan monitoring. The current area of 19.34 km^2 reported in section 5.2 is larger than the 14.16 km^2 reported in NPWS (2019), despite recorded losses exceeding recorded gains. Primarily this is due to the fact that some areas of 6210/*6210 habitat that had not been mapped during the previous reporting period (NPWS, 2019), such as areas of 6210 mapped in the Burren (O'Brien, 2020; Parr & Jeuken, 2021) or by the pilot and national fens surveys (O'Neill *et al*., 2023, Brophy *et al*., in prep.), have now been added to the dataset.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***15.530 km²***
		Maximum	***15.530 km²***
	b) Area in not-good condition	**Minimum**	***3.752 km²***
		Maximum	***3.752 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as that used in the 2013-2018 reporting period. One change was made to the assessment criteria: assessment of leaf litter now examines both depth and cover of litter, and a monitoring stop will only fail the litter criterion if it has both >25% litter cover and >5 cm litter depth. Formerly, only litter cover was examined. The taxa included in the current list of typical species are as follows: *Antennaria dioica, Anthyllis vulneraria, Arabis hirsuta, Asperula cynanchica, Blackstonia perfoliata, Brachypodium pinnatum, Briza media, Bromopsis erecta, Campanula rotundifolia, Carex caryophyllea, Carex flacca, Carlina vulgaris, Centaurea scabiosa, Ctenidium molluscum, Daucus carota, Filipendula vulgaris, Galium verum, Gentiana verna, Gentianella amarella, Gentianella campestris, Geranium sanguineum, Helictotrichon pubescens, Homalothecium lutescens, Knautia arvensis, Koeleria macrantha, Leontodon hispidus, Leontodon saxatilis, Linum catharticum, Lotus corniculatus, Origanum vulgare, Pilosella officinarum, Primula veris, Ranunculus bulbosus, Sanguisorba minor, Sesleria caerulea, Thymus polytrichus, Trisetum flavescens*, and all native orchid species. For upland examples of the 6210/*6210 habitat that tend to be more bryophyte-rich, the four bryophyte species *Ditrichum gracile, Hypnum lacunosum, Scapania aspera* and *Tortella tortuosa* were assessed as typical species. With the exception of the relatively common *Dactylorhiza fuchsii* and *Dactylorhiza maculata* the 6210 habitat should be considered for the orchid-rich priority habitat *6210 if one or more of the following less common orchid species are present: *Anacamptis pyramidalis, Coeloglossum viride, Dactylorhiza fuchsii* v. *okellyi, Epipactis palustris, Gymnadenia conopsea, Listera ovata, Neotinea maculata, Ophrys apifera, Ophrys insectifera, Orchis mascula, Orchis morio, Platanthera bifolia, Platanthera chlorantha, Spiranthes spiralis*.
6.8 Additional information *Optional*	The area of 6210/*6210 habitat in good condition was estimated at the 55 sites with extant 6210 habitat surveyed during the Grassland Monitoring Survey 2021-23, based on the percentage of monitoring stops at each site that passed their assessments (Favourable Structure and functions). Two sites could not be assessed as the habitat was no longer present. For each site, the area in good condition was obtained by multiplying the mapped site area by the percentage of monitoring stops in that site that passed the assessment. The total area in good condition for all sites was then calculated. The findings were that 203.6 ha (80.2%) of the 253.9 ha assessed were in good condition. The percentage of assessments that passed, not taking area into account, was 78.1% (207 out of 265 assessments). An additional 38 polygons that contained monitoring stops recorded by O'Brien (2020, 2022) and Parr & Jeuken (2021) were analysed in the same way, calculating the area of each polygon in good condition based on the percentage of monitoring stops that passed in each, before adding these up to get the total area in good condition. The

	results here were very similar, with 132.7 of the 164.9 ha (80.4%) found to be in good condition (passed the assessment). The percentage of assessments that passed, not taking area into account, was 76.5% (192 out of 251). As both sets of data provided very similar results they were combined. The overall percentage of area in good condition was 80.3%. The percentage of assessments that passed, not taking area into account, was 77.3% (399 out of 516 assessments). This was not significantly different from the pass rate in the 2013-2018 reporting period (χ^2 (1, N = 516) = 0.88, p > 0.05). The proportion of areas in good and not-good condition were scaled up to estimate the national area, based on 80.3% of the 19.34 km^2 of habitat being in good condition. The percentage of the 6210/*6210 habitat with Favourable Structure and functions has decreased slightly from 82.7% in the last reporting period (NPWS, 2019) to 80.3% in the current reporting period. However, the trend is reported as stable overall as the proportion of monitoring stops that passed in both reporting periods was found not to be statistically different (χ^2 (1, N =727) = 0, p > 0.05). These reported data are in respect of the structure and functions of extant 6210. Areas whose structure and functions have degraded to the extent that they are no longer considered to be the Annex I habitat have not been considered in this analysis. Such losses have been captured under area losses in section 5.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	High
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	High
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Medium

PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PA04 Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.)	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PK05 Mixed source soil pollution and solid waste (excluding discharges)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R04205 *Cotoneaster horizontalis;* R04215 *Cotoneaster integrifolius;* R04224 *Cotoneaster microphyllus;* R04246 *Cotoneaster simonsii*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures were recorded during field surveys for the GMS21-23 (Martin *et al.,* in prep.). Additional information was from O'Brien (2020), Parr & Jeuken (2021) and Dunford (2023).
7.4 Additional information *Optional*	As part of the GMS 2021-23, Martin *et al*. (in prep.) recorded all pressures in the 6210 habitat they surveyed, on a field-by-field basis. The percentage of 6210 habitat in each field that was negatively impacted by the pressure was recorded, together with its influence (high, medium or low). The total area impacted by each pressure could thus be calculated. The pressures were ranked according to the percentage of total surveyed area they impacted and the influence of the pressure. The results showed that over 15% of the 6210 area surveyed was impacted by intensive grazing or overgrazing, resulting in low sward heights and exposed bare soil, with a further 13% impacted by undergrazing, leading to rank swards and encroachment by non-grassland habitats such as scrub. Fertiliser application and conversion to improved agricultural grassland both had a high impact on 9% of the area surveyed, causing decreases in the frequency of typical species. Cumulatively, inappropriate management for agriculture (pressure codes beginning with PA_) had a high impact on over half of the area of 6210 surveyed. Martin *et al*. (in prep.) found that the main pressures that contributed to actual losses of 6210 were agricultural intensification (such as reseeding, overgrazing

	and fertiliser application), and undergrazing/abandonment (including ancillary effects such as scrub and bracken encroachment or succession to other habitats). Agricultural intensification led to complete loss of some areas of 6210 and high percentage loss (over 95%) at others. In one instance, 5 ha of 6210 in a limestone pavement/grassland mosaic outside an SAC was converted to reseeded pasture. Some impacts, such as invasion of calcareous grassland by *Cotoneaster* spp., have a high impact locally, but on a national scale have a lower influence. PI02 is therefore listed in section 7.1(d) as a medium-influence impact. The most commonly recorded invasive species listed under PI02 was *Cotoneaster integrifolius*. The 2019-2024 description of the code for problematic native species (PI03) states that it should only be used "if problems with native species cannot be associated with other more specific drivers/pressures (e.g. when problems with native species can be associated with multiple human activities or more precise activities are unknown)." In most cases, the main drivers of problematic native species such as Hazel, Blackthorn and Bracken can be ascribed to insufficient scrub management or insufficient grazing and the issue is listed under the PA08 code. Sometimes, however, there were recorded instances where their spread could not be attributed directly to undergrazing, and so at a limited number of sites the issue was recorded as a separate impact. Overall, scrub encroachment, whatever the driving factor, is a frequent impact that causes both habitat loss and deterioration of structure and functions, and scrub management is needed at many sites with 6210 habitat. It is worth noting, however, that some scrub is a valuable addition at most sites in terms of its biodiversity value – the issue arises when scrub is expanding at the expense of 6210. Further information on pressures was provided by Dunford (2023), whose findings are generally in line with those of Martin *et al.* (in prep.). Dunford noted that the reasons for lower conservation scores in fields scored in 2023 were inappropriate grazing (mostly insufficient grazing in summer and/or winter), increased levels of scrub encroachment/regrowth on areas previously cut (these likely due to undergrazing noted above, or else reductions in scrub management), increases in the area of where silage feeding was taking place, and neglect of grazing infrastructure, including watering facilities, feed equipment, walls and fences. Placement and maintenance of grazing infrastructure affects where and how easily livestock (usually cattle) access grazing land. Climate change and nitrogen deposition from the atmosphere have not been added as impacts, but they may both affect the range and species composition of the habitat (EPA, 2017).

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** ***b) Expand the current range of the habitat type (related to 'Range')*** ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / **increase habitat area**/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MI05 Management of problematic native species
8.7 Additional information *Optional*	As part of the Grassland Monitoring Survey (GMS) 2021-23, Martin *et al*. (in prep.) recorded active (currently being implemented) and recommended (not yet implemented but would benefit the habitat) conservation measures in the 6210 habitat they surveyed, on a field-by-field basis. In addition, the current level of management was broadly assessed, e.g., appropriate, too intense or not intensive enough. Recording the current level of management helped inform the conservation measures, as well as the status of the measure (i.e., active or recommended). So, for example, if grazing was currently

	being carried out, was maintaining the 6210 habitat and not negatively impacting it (i.e., was being carried out at an appropriate level), then the corresponding conservation measure recorded was MA03 'Maintain existing extensive agricultural practices and agricultural landscape features', and its status was 'Active'. If management levels needed to be adjusted, then the corresponding conservation measure was MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', and its status was 'Recommended'. In this way, conservation measures, both active and recommended, were recorded in sites surveyed during the GMS21-23 (Martin *et al.*, in prep.). Conservation measures recorded included routine farm activities such as grazing and mowing, which form part of day-to-day farm management but have a positive effect on the conservation status of the 6210 habitat, as well as specific measures directly aimed at improving the conservation status of the habitat, such as removal of invasive species. Conservation measures were ranked based on their frequency of occurrence across all sites. Martin *et al*. (in prep.) give a detailed breakdown of the active conservation measures recorded across the 57 sites assessed, all of which are currently having a positive impact on the Annex I habitat areas surveyed. Appropriate grazing (mostly by cattle, although horse, sheep and mixed animal grazing were also recorded) was the most commonly recorded active measure, recorded under MA03 Maintain existing extensive agricultural practices. Active conservation measures that successfully reversed negative pressures observed during the previous round of monitoring were recorded. For example, an appropriate level of cattle grazing, recorded within site 1272, has removed the negative pressure of undergrazing recorded there in 2017. Martin *et al*. (in prep.) also report the recommended conservation measures recorded across the 57 sites of the survey. All such measures aim to have a positive effect on the Annex I habitat, once they have been implemented. A control programme for problematic native scrub, under code MI05, was the most frequently recommended measure. Such a programme could be required for sites where the grazing level within the grassland areas is appropriate but, due to a grazing preference for herbaceous species, scrubby areas are not being controlled by grazing. This scenario is most prevalent in areas where scrub has become established over a number of years. MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) was also commonly recommended. The main recommended measures are: MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)

	MA07 Restoration of Annex I agricultural habitats (incl. re-establish and improve) ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species MS04 Manage native species (incl. non-Directive species) The areas where some of these recommended measures need to be implemented are relatively small. For example, a control programme for invasive alien species was recommended, under code MI03, for eight sites surveyed by Martin *et al*. (in prep.), but invasive alien species (code PI02) only affected a total of 0.82 ha (0.32%) of the 6210/*6210 area surveyed by that survey. Other areas outside of the surveyed areas are known to be affected, particularly in the Burren. The most frequent invasive alien species recorded within the 6210/*6210 habitat were non-native *Cotoneaster* species. An active programme of *Cotoneaster* removal is currently taking place at Castlesampson Esker SAC (001625) and Killeglan Grassland SAC (002214), and in parts of the Burren. These actions are being taken specifically to improve the conservation status of 6210 and associated habitats such as limestone pavement. Other recommended measures recorded include: ME01 Reduce impact of transport operation and infrastructure relates to the management of gravel used for tracks and paths. MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) relates primarily to the problem of scrambler bikes, which has impacted negatively on 6210/*6210 habitat at a number of sites, and the impact of walkers, particularly in areas of the Burren. The area under active conservation management is difficult to quantify, as conservation measures are not always implemented across the habitat as a whole (e.g. clearance of invasive species). However, frequency data recorded by Martin *et al.* (in prep.) during the GMS 2021-23 provide valuable insight. Of the 55 sites they surveyed that still contained some extant 6210 habitat, all but five sites were found to have some form of active management, i.e. 91% of sites were actively managed, though not always at an appropriate level. The five unmanaged sites were abandoned for a variety of reasons, including lack of access for cattle (due to a quarry) and legal issues. From these data and given the prevalence of grazing as a management practice carried out across 6210 habitat in Ireland (albeit often in the normal course of managing the farm, rather than as a specific conservation measure to maintain the Annex I habitat), the percentage of 6210/*6210 habitat impacted positively by active conservation measures is deemed to fall within the 50-90% bracket. In some cases, the maintenance of extensive agricultural practices such as grazing, or habitat maintenance activities such as scrub clearance, are undertaken through agri-environment schemes, such

	as the Department of Agriculture, Food and the Marine's (DAFM) Agri-Climate Rural Environment Scheme (ACRES), or the NPWS Farm Plan Scheme. The ACRES Co-operation Project (CP) is particularly aimed towards areas of High Nature Value farmland, mostly in the western half of Ireland, and is a results-based scheme, with higher payments linked to improvements in biodiversity scores. The NPWS Farm Plan Scheme operates on a similar basis. The Burren Programme was the first such results-based scheme to be initiated in Ireland and was markedly successful, with a similar LIFE project run in the Aran Islands. In the previous monitoring report (NPWS, 2019), it was reported that the conservation measures applied by the Burren Programme had improved the Structure and functions of 6210/*6210 within the areas covered by the scheme. However, with the discontinuation of the Burren Programme and its replacement by the somewhat more generic scheme, ACRES, continued effectiveness will need to be tested. It should be recognised that the management regimes of most 6210/*6210 grassland habitats are driven by the landowner rather than by any formal management plan or policy; therefore, the continued operation of the management regimes currently in place is not guaranteed. Other measures that are not specifically covered by the list of conservation measures, but which have a positive effect on 6210 conservation, include programmes of education and outreach by organisations such as NPWS and Farming for Nature, which are aimed at raising awareness about species-rich grasslands and encouraging appropriate management. Other schemes such as European Innovation Partnership projects (EIPs) have a beneficial effect at a landscape level and may help protect the 6210 habitat directly or indirectly by raising awareness and improving biodiversity at a regional scale.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / Poor / **Bad** / Unknown*
	c) Structure and functions	*Good / **Poor** / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *decreasing*. Current range is 2.5% less than the Favourable Reference Range. Conservation status of Range is therefore *Unfavourable-Inadequate*, with the magnitude of the known loss 0.21% per annum. Future trend of Range is assessed as *negative*, as the range is expected to decrease in the future, based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Poor*. Short-term trend direction of Area is assessed as *decreasing*. Current area is 11-25% less than Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Bad*, with the magnitude of the known loss 1.66% per annum. Future trend of Area is assessed as *negative*, as area is expected to decrease based on the balancing of the threats and	

	conservation measures that are currently in place. Future prospects of Area are therefore *Bad*. Current Structure and functions are assessed as *Unfavourable-Inadequate*, as >75% but <90% of habitat is in good condition. Short-term trend direction is *stable* (for habitat that is in good condition). Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *stable*, due to the combination of existing pressures and conservation measures. Future prospects of Structure and functions are therefore *Poor*. Sections 8.6 and 8.7 list conservation measures that are recommended or are actively being implemented across the 6210 resource in the country. If the recommendations were to be fully implemented, the future trend of Area could be assessed as stable. However, it is impossible to be certain that sufficient recommended measures will in fact be carried out over the next monitoring period. Enactment of the Nature Restoration Law in the next reporting period is predicted to have some positive effects on 6210 habitat area. Therefore, the future trend of Area for this monitoring period is assessed as *negative*, a slight improvement on the *very negative* assessment reported in the previous monitoring report. It should be noted that programmes such as ACRES and NPWS Farm Plans are counterbalancing negative trends in some areas, particularly where no conservation management had previously been implemented, and the Nature Restoration Law is expected to prove beneficial to the habitat as a whole.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***

	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range has deteriorated, from *Favourable* in the previous reporting period to *Unfavourable-Inadequate* in the current period, due to the recorded loss of 6210 from two 10x10 km grid cells at the edge of the habitat's range, which has led to the contraction of the range by six grid cells, a decrease of 0.21% per annum. The Conservation Status of Area remains *Unfavourable-Bad* as in the previous reporting period, as the current area is 11-25% less than Favourable Reference Area. The Conservation Status of Structure and functions remains *Unfavourable-Inadequate* (75-90% of the habitat in good condition), as in the previous reporting period. The Overall Conservation Status is assessed as *Unfavourable-Bad*, as it was during the last reporting period. The status of *Unfavourable-Bad* during the current reporting period is due to the loss in area of 1.66% per annum (20% between 2013 and 2024), and the fact that the current area is more than 10% smaller than the Favourable Reference Area. Overall trend in Conservation Status is assessed as *deteriorating* during the current reporting period, as large areas of the habitat have been lost due to impacts such as agricultural intensification. These impacts are expected to continue into the future across at least some of the habitat. It is envisaged that improvements in the condition of the habitat will continue to take place in at least some areas of the habitat through various initiatives such as NPWS's Farm Plan scheme and Department of Agriculture's ACRES agri-environment scheme, as well as the implementation of the EU's Nature Restoration Law.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***12.410 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	

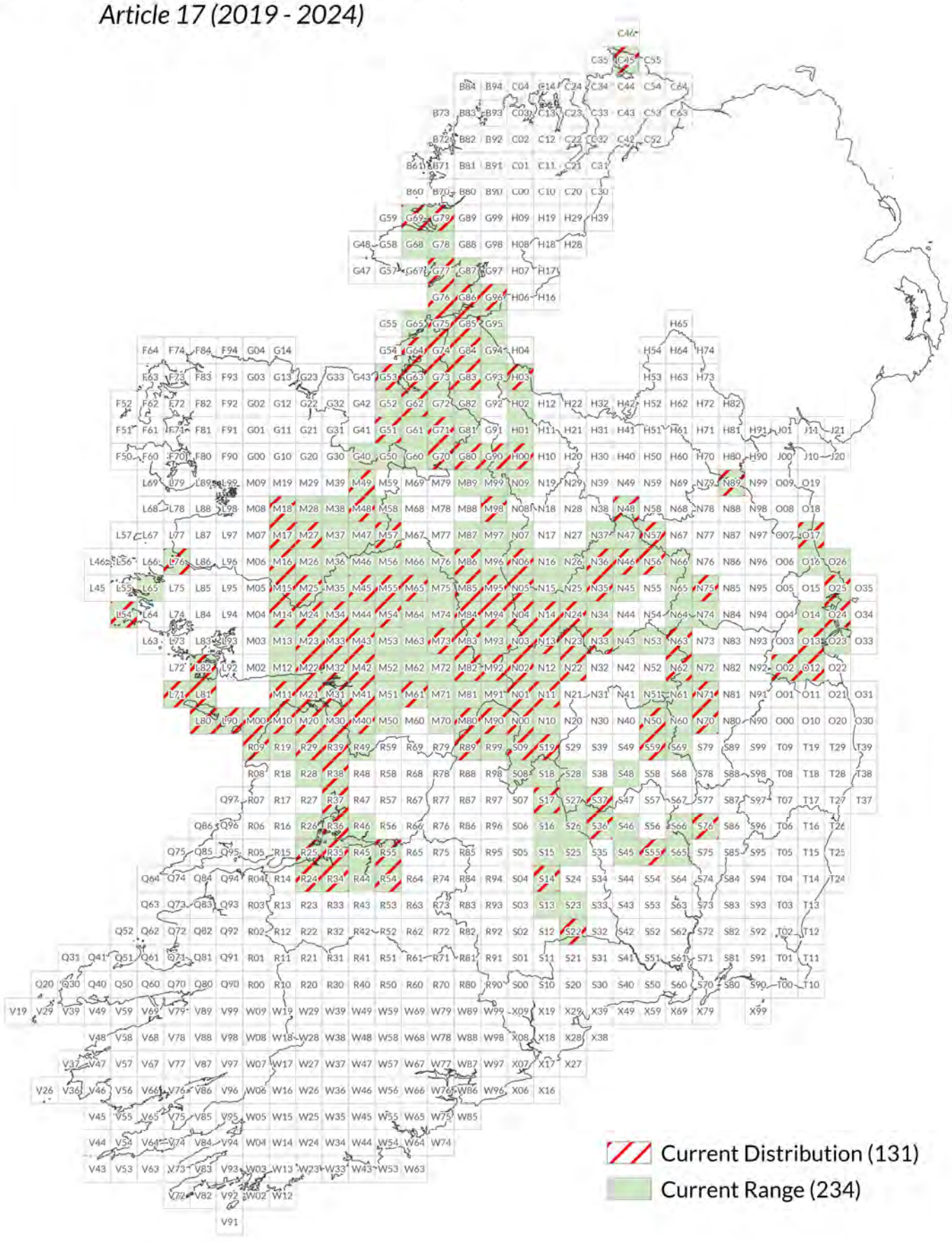
11.3 Surface area of the habitat type inside the network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / **decreasing** / uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution shapefiles and the SAC shapefile. Point and polygon files were both used, but an abridged version of the point file was used which only included points that did not overlap with a polygon. The assigned areas of the points that fell within an SAC boundary were added up to calculate the area contributed by the points. For the polygons, a straightforward union was carried out between the polygon distribution file and the SAC shapefile. The area of each polygon in the union ('Union_area') was calculated in GIS and the percentage of 6210 habitat in each polygon was then multiplied by the Union_area to obtain the area of 6210 habitat in the polygon. A series of sorts was then carried out in Excel to calculate the area of 6210 habitat within the network, and within the SACs for which 6210 is a QI. The area given in section 11.1 (12.410 km^2) is the total area of the 6210/*6210 habitat in SACs in the country, including some SACs where the habitat is not listed as a qualifying interest (QI). The area of

	6210/*6210 within the SAC network where it is listed as a QI is 11.817 km^2. In the Grassland Monitoring Survey 2021-23 (GMS 2021-23), Martin *et al*. (in prep.) reported an estimated net loss of 39.53 ha of 6210 habitat from SACs, with a further 25.57 ha lost from outside SACs. Losses in SACs were mainly due to abandonment, undergrazing or agricultural improvement. There were, however, small gains in habitat in some SACs, for example, in SAC 000566 (gained 0.1 ha due to recolonisation of an old quarry) and SAC 001774 (gained 0.65 ha due to nature-positive management). The largest single loss in area was at a site in Co. Galway, where the loss of 26.1 hectares was mostly incurred during the previous monitoring period (Martin *et al*., 2018). This loss was due to undergrazing, but the situation has since stabilised and undergrazing has promoted other Annex I habitats such as calcareous heath and Juniper scrub, so the habitat has now transitioned to one of equally high conservation value, although not 6210. Of the SACs where 6210 habitat is listed as a QI, there was a net loss of 8.37 ha, due mainly to agricultural improvement at one site (002214 Killeglan Grassland SAC). In terms of structure and functions within the SAC network, the rate of failures of assessments was broadly similar inside and outside of the SAC network. An analysis of data from Martin *et al*., (in prep.), Parr & Jeuken (2021) and O'Brien (2020) showed that sites within SACs fared slightly better (although the difference was not statistically significant), with a slightly higher rate of stops passing (82%) compared to sites outside the network (74%). Of the 55 sites with extant 6210 habitat assessed for Structure and functions by Martin *et al.* (in prep.), 15 (54%) of the 28 sites that were assessed as *Favourable* were in an SAC (13 of them list 6210 as a QI). Six (54%) of the 11 sites that were assessed as *Unfavourable-Inadequate* were located within SACs (all list 6210 as a QI). The biggest difference noted was in the proportion of sites that received an *Unfavourable-Bad* assessment: the majority of them (65%) were located outside the SAC network. Structure and functions failures in SACs were most often due to issues such as scrub or Bracken encroachment. Rarely, nutrient enrichment or overgrazing were noted, and invasive *Cotoneaster* species were a specific problem at some sites, notably 001625 Castlesampson Esker SAC, where an active control programme is under way. The short-term trend of the habitat area in good condition within the SAC network is taken to be *stable*, with the same trend as the 6210 habitat nationally.

12 Complementary information *N/A*

Orchid-rich calcareous grassland* (6210)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**6230 Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)***
1.2i Habitat short name	**Species-rich *Nardus* grassland***
1.3i Habitat description	Habitat 6230 'Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)' is typically found on siliceous substrates in upland areas (montane and sub-montane zone), usually near the upper limit of enclosed farmland. It has probably always been a relatively rare habitat in Ireland and it relies on extensive grazing, usually by sheep, to maintain the habitat over almost all of its range. Habitat 6230 often occurs in a mosaic with heath. This habitat is defined as grasslands occurring on siliceous substrates with a notable richness of species present. Typically, they occur on slopes where there is flushing of at least mildly base-rich water, resulting in the occurrence of a range of species indicative of basic influence, such as *Thymus polytrichus, Linum catharticum* and *Ctenidium molluscum*, in association with species characteristic of acidic uplands, including *Potentilla erecta* and *Galium saxatile*. It is this mix of species of calcareous and siliceous conditions that provides the requisite element of species richness. A significant additional element of species richness is often provided by bryophytes, particularly in the far west, but there should also be a species-rich element of vascular plants present. Grasslands on calcareous substrates such as limestone cannot be included within this habitat. Grasslands that show relatively high species richness but are flushed with strongly acidic water and are dominated by *Sphagnum* species or *Polytrichum commune* should also not be included within this habitat. 6230 habitat in Ireland has an affinity to the *Violinion caninae* association (Perrin, 2021). It corresponds most closely to the Irish Vegetation Classification (IVC; Perrin, 2024) communities GL4B *Nardus stricta – Potentilla erecta* grassland and GL4C *Agrostis capillaris – Potentilla erecta* grassland, two communities in the GL4 *Nardus stricta – Galium saxatile* group (Perrin, 2021). It is represented in the National Vegetation Classification system (Rodwell, 1992) by the communities CG10, CG11, U4 and U5.

2 Maps

Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1965-2023***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was derived from polygon, polyline and point shapefiles. All shapefiles were created by compiling relevant data which referred to habitat 6230. A soils dataset (Fealy *et al.* 2009) was used to confirm that all proposed areas of 6230 were on acid bedrock or substrate. If not, they were removed from the 6230 dataset. The main source of polygon data from the current monitoring period is the 'Review of four upland/uncommon grassland habitats' project conducted by Hodd *et al.* (in prep.), with additional polygons from the National Fen Survey (Brophy *et al.*, in prep.), baseline habitat mapping of the MacGillycuddy's Reeks Phase 1 (Scott Cawley, 2020), and a survey of part of the Maamturks (Hodd, 2023). Sources utilised for the distribution map from the last reporting period (NPWS, 2019) were also included: Coillte Biodiversity Dataset (2000-2007), Galway County Council (2017), 10 National Survey of Upland Habitats (NSUH) sites (Perrin *et al.* 2011, 2012, 2013a-c, 2014a, 2014b; Roche *et al.* 2010a, 2010b, 2011), Burke (2001) utilised in O'Donovan (2007), Dwyer *et al.* (2007), O'Neill *et al.* (2013) and the GIS shapefile for Connemara National Park (based on Kaule *et al.*, 2008). For the current monitoring period, points were added to the distribution from a number of sources, including: – NPWS's rare plant records for key species such as *Alchemilla alpina* – the National Vegetation Database (NVD) of relevés recorded between 1965 (Austin O'Sullivan) and 2014 (Perrin *et al*., 2014a, b). Relevés that were classified as GL4B and GL4C, and that had appropriate indicator species and high species richness and were on a siliceous substrate, were included – miscellaneous records of 6230 noted by ecologists while carrying out other surveys. All sources are detailed below in section 3.4. A certainty rating was assigned to mapped polygons, polylines and points, with a range of 3 to 1 from high to low certainty (corresponding to definitely/ probably/possibly 6230). Recent data sources (10 years old or less) listed in section 3.4 recorded by experienced ecologists, and where the habitat was visited, were assigned a high certainty=3. These are accepted as being the 6230 habitat. No dataset over 10 years old was assigned a certainty=3, as there is a possibility that the grassland habitat recorded over 10 years ago may not still be present. Data sources where the habitat was confirmed but 10-20 years have elapsed since the surveys, or more recent surveys where the habitat was viewed from a distance rather than walked, were assigned a lower

	certainty=2. Older data sources (more than 20 years old) that possibly include the 6230 habitat were assigned a low certainty=1. Of the data sources used in the last round of reporting (NPWS 2019), Galway County Council (2017) and Perrin *et al*. (2014a, b) were still judged to be recent enough (within the last 10 years) for a certainty of 3 to be assigned to them. Reliable datasets (such as the earlier National Surveys of Upland Habitats) that were, however, over 10 years old were assigned the lower certainty value of 2 as there is a chance that the habitat may have changed. The Coillte Biodiversity Dataset is from the early 2000s, and the current indicator species lists were not developed until after this dataset was completed. Certainty values of 2 or 1 were assigned to this dataset, as follows: The Coillte Biodiversity Dataset polygons were assigned a certainty value of 2 where 6230 habitat was recorded and a list of species provided, so the call of 6230 could be confirmed. Coillte Biodiversity Dataset polygons were assigned a certainty of 1 where 6230 habitat was recorded but there was no additional information on species within these areas. A certainty value of 1 was assigned to points associated with rare plant records, regardless of how recently the record was made, as there is only 1 species present to indicate 6230 habitat. National Vegetation Database (NVD) plots conforming to 6230 vegetation communities that were recorded prior to 2000 were assigned a certainty of 1, those recorded between 2001 and 2013 a certainty of 2, and those recorded after 2013 a certainty of 3, provided the substrate was siliceous and not calcareous. An interim working file was initially compiled that included all records considered for the distribution map. Further scrutiny was applied at a more detailed level to determine if particular records within the datasets represented the habitat, using information such as species lists provided by field surveyor notes, or whether the area was walked, viewed or reviewed by remote imagery. A certainty value of 0 was assigned to records that were deemed not to represent 6230. All polygons or points with certainty 1 to 3 were used to map the distribution of the 6230 habitat. Records that were considered not to represent 6230 habitat were assigned a certainty value of 0 and were not included in the final distribution file. All data sources with a certainty of 1 to 3 were used to map the distribution of the 6230 habitat and, from this, to derive the habitat's range.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*

3.2 First time reporting	*YES/**NO***
3.3 Additional information	DG Environment (2023) Reporting under Article 17 of the Habitats Directive: Guidelines on concepts and definitions – Article 17 of Directive 92/43/EEC, Reporting period 2019-2024. Brussels. Pp 104. European Commission (eip-agri): 'A sustainable agricultural plan for the MacGillycuddy Reeks – Conservation and restoration of upland habitat in the MacGillycuddy Reeks'. https://eu-cap-network.ec.europa.eu/projects/search_en. European Commission (eip-agri): 'Blackstairs farming futures (BFF) Sustainable farming project in the Blackstairs Mountains'. https://eu-cap-network.ec.europa.eu/projects/search_en. European Commission (eip-agri): 'Sustainable Uplands Agri-environment Scheme (SUAS)'. https://eu-cap-network.ec.europa.eu/projects/search_en. Fealy, R., Loftus, M. & Meehan, R. (2006) EPA soil and subsoil mapping project: Summary Methodology Description for Subsoils, Land Cover, Habitat and Soils Mapping/Modelling. Version 1.2. Teagasc, Dublin.
3.4 Sources of information	**Polygons:** Bleasdale, A. (1994) SAC file note for Connemara Bog Complex SAC (site code 002034). Brophy, J. *et al*. (in prep.) National Fen Survey: 2021-2023 data. Coillte Biodiversity Dataset. GIS files and individual site management plans were made available by Coillte. Datasets used were from 2000 to 2007. Connemara National Habitat Map shapefile. Based on vegetation map of Connemara National Park produced in 2008 by G. Kaule *et al*., Institute of Landscape Planning and Ecology, University of Stuttgart. Duff, K. & Denyer, J. (2012) An ecological assessment of Bride's Glen. Unpublished report to DLR County Council. Duff, K. & Denyer, J. (2013) An ecological assessment of habitats in Glencullen. Unpublished report to DLR County Council. Dwyer, R., Crowley, W. & Wilson, F. (2007) Grassland Monitoring Project 2006. Unpublished Report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Hodd, R.H. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Survey for Hometree. Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) Review of four upland/uncommon grassland habitats (6230, 6430, 6150, 6170). *Irish Wildlife Manuals* No. 1XX, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. (Note: some points and polylines also from this.)

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. *Irish Wildlife Manuals*, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010 - 2012) Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932), Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH10_Mweelrea_Sheeffry_Erriff_Report_01c_M.pdf.

Perrin, P.M., Roche, J.R., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 7: Mount Brandon cSAC (000375), Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH11_Mount_Brandon_Report_01b_M.pdf.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013a) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 10: Ox Mountains Bogs cSAC (002006), Cos. Mayo and Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH12_Ox_Mountains_Bogs_Report_01b_M.pdf.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013b) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 13: Cuilcagh – Anierin Uplands cSAC (000584), Cos. Cavan and Leitrim. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH12_Cuilcagh_Anierin_Uplands_Report_01b_M.pdf.

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Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH13_Caha_Mountains_01b_M.pdf.

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Roche, J.R., Perrin, P.M. & Barron, S.J. (2010a) National Survey of Upland Habitats (Pilot Survey Phase, 2009-2010), Site Report No. 3: Comeragh Mountains cSAC (001952), Co. Waterford. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/SPEU09_Comeragh_Mountains_Report_01b_M.pdf.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2010b) National Survey of Upland Habitats (Pilot Survey Phase, 2009-2010), Site Report No. 4: Carlingford Mountain cSAC (000453), Co. Louth. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/SPEU09_Carlingford_Mountain_Report_01b_M.pdf.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010 - 2012), Site Report No. 6: Croaghaun / Slievemore cSAC (001955), Co. Mayo. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NSUH10_Croaghaun_Slievemore_Report_01b_M.pdf.

Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG.

Additional points obtained from:

Hodd, R.H. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Survey for Hometree.

NPWS rare plant records (*Alchemilla alpina* and *Pseudorchis albida*) - various sources.

National Vegetation Database: relevés recorded by A. Bleasdale (1995), A. O'Sullivan (1965-1982), Crawford *et al.* (1996), E.C. MhicDaeid (1976), Roche *et al.* (2010, 2011), O'Neill *et al*. (2013).

Miscellaneous records of 6230 from Rory Hodd and Maria Long.

Polylines obtained from:

Hodd, R.H. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Survey for Hometree.

	Other information from: DAFM (2023) Ireland's forest strategy 2023-2030. Report by Department of Agriculture, Food and the Marine, Ireland. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford. Forest Service, Department of Agriculture, Food and the Marine (2015) Forestry Programme 2014-2020: IRELAND. Submitted in accordance with European Union Guidelines on State aid for agriculture and forestry and in rural areas 2014 to 2020. https://www.agriculture.gov.ie/media/migration/forestry/forestryprogramme2014-2020/IRELANDForestryProgramme20142020230215.pdf Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Perrin, P.M. (2021) Irish Vegetation Classification: Group synopses for GL Grassland Group. https://biodiversityireland.ie/projects/ivc-classification-explorer/ Accessed 02/05/2025. Perrin, P. (2024) *Handbook for the Irish Vegetation Classification*. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024. Rodwell, J.S. (ed.) (1992) *British plant communities Volume 3: Grasslands and montane communities*. Cambridge Community Press, Cambridge. **Other sources consulted:** Anon. (2024a) Environmental Requirements for Afforestation, Department of Agriculture, Food & the Marine, Ireland. Anon. (2024b) Land types for Afforestation: Soil & fertility, Department of Agriculture, Food & the Marine, Ireland. Forestry Division (2024) Afforestation Scheme 2023 – 2027, Department of Agriculture, Food & the Marine, Ireland. NSUH Phase 5 surveys (fieldwork carried out in 2020) were checked but no 6230 habitat was recorded. Project site reports are as follows: Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland.

	Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***14,500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	

4.6 Short-term trend **Magnitude** **Type of estimate** *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend **Period** *Optional*	***2000-2024***	
4.9 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km²*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	

4.13 Range when Directive came into force *Optional*	
4.14 Additional information *Optional*	Current range was calculated using the range tool, based on the current known distribution of the 6230 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The current range is higher than the range in the previous reporting period, increasing from 127 10x10 km grid cells (NPWS, 2019) to 145 10x10 km grid cells, a net increase of 18 grid cells. Both additions and removals of grid cells were carried out. A number of areas included in the distribution in the last two reporting periods were removed from the 6230 distribution because they do not conform to the new definition (e.g. those occurring on calcareous geology; see section 5.3 for further details). This caused the removal of seven cells from the distribution reported in NPWS (2019), resulting in a decrease in range of 11 cells, but this is regarded as an adjustment / correction, rather than a genuine contraction in range. Similarly, the addition of mapped areas of 6230 to the distribution added a further 29 new 10x10 km grid cells to the range since 2019. These are likely to represent previously unrecorded extant areas of 6230, thus the additions made to the range do not indicate a genuine expansion in range. Short-term trend of Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Owing to the changes in range noted above, and the conclusion that none of the changes were as a result of genuine changes, the short-term trend is assessed as *stable*. The long-term trend of Range is also assessed as *stable*. The Favourable Reference Range has increased since the last reporting period (NPWS, 2019) to reflect the improved knowledge of the habitat's distribution. There is no evidence of loss of range since the Directive came into force and the current range is considered sufficient for the long-term survival of the habitat.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1994-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.172 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	

<table>
<tr><td>5.4 Surface area
Method used</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="2">5.5 Change and reason for change in surface area</td><td colspan="2">Is there a change between reporting periods?

(If yes, more than 1 option a) to f) can be chosen)

a) no, there is no change
<u>b) yes, due to genuine change</u>
<u>c) yes, due to improved knowledge/more accurate data</u>
<u>d) yes, due to the use of different method</u>
e) yes, but nature of change is unknown
f) yes, due to other reasons</td></tr>
<tr><td colspan="2">The change is mainly due to (select one of the reasons below):

a) genuine change
<u>b) improved knowledge or more accurate data</u>
c) the use of a different method
d) unknown
e) other reasons</td></tr>
<tr><td>5.6 Short-term trend
Period</td><td colspan="2">2013-2024</td></tr>
<tr><td>5.7 Short-term trend
Direction</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="4">5.8 Short-term trend
Magnitude

Optional</td><td>a) Estimated Minimum</td><td></td></tr>
<tr><td>b) Estimated Maximum</td><td></td></tr>
<tr><td>c) Pre-defined range</td><td>Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.

☐ <u>0 – 12%</u>
☐ 13 - 25%
☐ 26 - 50%
☐ 51 – 100%
☐ >100%</td></tr>
<tr><td>d) Unknown</td><td></td></tr>
<tr><td>5.9 Short-term trend
Magnitude
Type of estimate</td><td colspan="2">Best estimate / multi-year mean / 95% confidence interval / minimum/<u>pre-defined range</u></td></tr>
</table>

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
b) Based mainly on extrapolation from a limited amount of data
<u>c) Based mainly on expert opinion with very limited data</u>
d) Insufficient or no data available</td></tr>
<tr><td rowspan="7">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ <u>between 11% and 25% smaller than the FRA</u>
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 1994 and incorporates updates made during the current reporting period. Point data prior to 1994 were included to determine the distribution and range of the habitat, but minimal areas were contributed by point data overall, and none pre-1994. The percentage of the known 6230 resource that was surveyed and mapped in this monitoring period is 7.3%, and in the previous monitoring period is 10.9%. The largest proportion of the mapped 6230 habitat (42.0%) comes from data that were recorded between 2000 and 2007, before the habitat criteria were precisely defined in Ireland. The figure calculated here, 3.17 km^2, is significantly lower than the figure of 6.11 km^2 calculated for the last Article 17 assessment (NPWS, 2019). There are several reasons for this. The first is as a result of a desk review and fieldwork carried out by Hodd *et al*. (in prep.) for the NPWS-commissioned 'Review of four upland/uncommon grassland habitats' project. As part of that project, the habitat definition was refined to exclude the non-calcareous flushed community, which had been recognised in previous reports (see section 6.7 for further details on typical species). When Hodd *et al*. (in prep.) visited areas that had been mapped as 6230 by older surveys (mainly Dwyer *et al*., 2007, Kaule *et al*., 2008, Roche *et al*., 2010b and O'Neill *et al*., 2013), they found that some areas did not conform to the current definition of the 6230 habitat. Hodd *et al*. (in prep.) also conducted a review of polygons and points that were included within the distribution for the previous Article 17 assessment (NPWS, 2019) for 6230. In a number of instances, subsequent survey or other information indicated a high probability that these occurrences do not in fact correspond to the Annex I habitat, and they were assigned a certainty of 0. This applied to points and polygons that occur on calcareous bedrock, the majority of which were located within Sligo and Leitrim. Points and polygons located on bands of calcareous rock in areas where the vegetation mostly shows siliceous influences were retained, subject to further investigation. This was primarily on Lakes Marble (a metamorphosed limestone) and schists in Connemara. A number of large polygons in the Galtee Mountains SAC recorded by Dwyer *et al.* (2007) were removed, as the site was resurveyed by the NSUH (Roche *et al.*, 2014), which did not record any Species-rich *Nardus* grassland within the SAC, using updated definitions and criteria. A further small number of polygons were removed, for example from Glengarriff Woods and Harbour SAC, as they were known not to correspond to the current definition of Species-rich *Nardus* grassland, showing low species richness and no calcareous influence. These areas were removed from the dataset, or else the boundaries of the habitat were mapped more accurately following field survey. These changes are mostly due to a change in

	interpretation rather than habitat loss (although Hodd *et al*. (in prep.) note that genuine habitat losses were recorded by Dwyer *et al*., (2007)), and it is the main reason for selecting 'change in method' in section 5.5. Some loss of 6230 habitat area was reported in the current reporting period in Bolingbrook Hill SAC by Hodd *et al.* (in prep.), where undergrazing and lack of management have led to the development of rank grassland and scrub. The area lost was not quantified exactly but is in the order of 1 to 1.5 ha. Another cause of the area change was a review of aerial imagery of the polygons from the Coillte Biodiversity Dataset 2000-2007. This is the largest source of mapped 6230 habitat, although there are limited additional data available from the Coillte dataset to provide certainty that what was mapped as 6230 conforms to the latest definition of the habitat. Most of the polygons were retained, but on review, many of the polygons were found to have become heath or forestry, as evidenced by heather or trees visible in aerial photographs. The percentage of 6230 estimated as being present in these polygons was reduced to a more appropriate figure based on the imagery. This change accounted for 0.45 km^2 of the decrease. It is considered that any changes that took place pre-date both this reporting period and the last, judging by the age of the trees and extent of the heath observed. Two further polygons were found to be on a calcareous substrate, which meant that they could no longer be classified as 6230 habitat. The change in area from the exclusion of these polygons was 0.12 km^2. Polygons were also removed from the Wicklow Mountains, where searches by Hodd *et al*. (in prep.) for 6230 habitat in a range of locations did not lead to the discovery of areas of this habitat. There is some uncertainty that this is a genuine loss of habitat, and it is more likely that it represents a correction to the distribution, owing to the age of the original record. These changes resulted in the loss of seven 10x10 km grid cells from the distribution of 6230, while the addition of new data has resulted in the identification of 18 additional grid cells where this habitat is thought to occur. It should be noted that it is possible that the habitat does not occur in other grid cells within the distribution due to the change in definition, particularly where its presence was not checked by the Hodd *et al.* (in prep.) survey. Conversely, it is possible that unmapped areas of this habitat also occur. The Favourable Reference Area was not determined exactly. However, it is deemed to be 11-25% greater than the current area, given that anthropogenic losses are known to have occurred since the Directive came into force. The loss of some habitat in the current reporting round is mentioned above, and in addition, a number of instances of habitat loss were itemised in the last reporting round (NPWS, 2019).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.0937 km²***
		Maximum	***0.0937 km²***
	b) Area in not-good condition	**Minimum**	***0.1437 km²***
		Maximum	***0.1437 km²***
	c) Area where condition is not known	**Minimum**	***2.9344 km²***
		Maximum	***2.9344 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		
6.7 Typical species Method used *Optional*	As examples of this grassland typically have base-rich influence, assessing the indicator species present based on whether the grassland is in a base-rich or base-poor situation (as carried out in the previous monitoring period) is not necessary. Therefore, the lists of high-quality indicators for base-poor and base-rich types were combined and modified to give a single list of high-quality indicator species, as follows: **High-quality indicators:** *Alchemilla spp., Antennaria dioica, Breutelia chrysocoma, Campanula rotundifolia, Carex caryophyllea, Conopodium majus, Ctenidium molluscum, Danthonia decumbens, Lathyrus linifolius, Linum catharticum, Lotus corniculatus, Lysimachia nemorum, Primula vulgaris, Prunella vulgaris, Thymus polytrichus.*		

	General indicators: *Agrostis capillaris, Anthoxanthum odoratum, Carex binervis, Carex pilulifera, Carex pulicaris, Euphrasia* spp. (count as one), *Festuca ovina/vivipara* (count as one), *Galium saxatile, Hylocomium splendens, Luzula multiflora/L. campestris* (count as one), *Nardus stricta, Polygala serpyllifolia, Potentilla erecta, Pseudorchis albida, Rhytidiadelphus loreus, Rhytidiadelphus squarrosus, Veronica officinalis, Viola canina, Viola riviniana.* A number of the base-poor indicator species are weak indicators of this grassland in general in Ireland, particularly *Pseudorchis albida* and *Viola canina*, which usually occur in non-grassland habitats in Ireland. Most recent records of *P. albida* are from dry heath habitats (Conaghan *et al.*, 2011). *Viola riviniana* is also a poor high-quality indicator, as it occurs in a wide range of grasslands and other habitat types of varying base status. These species were retained as indicators but were moved to the general indicator list. It is considered that multiple *Alchemilla* species can act as high-quality indicators of this habitat, so *Alchemilla glabra* was replaced with *Alchemilla* species. In particular, *A. alpina* is likely to indicate high-quality stands of this habitat. Although it is restricted in its distribution in Ireland to three sites, it often occurs in this grassland at its sites in Co. Kerry, and it is considered to be a key species of some types of this grassland in the UK. The number of high-quality indicator species required has been set at two or more species in all cases. *Cirsium palustre* was added to the list of negative indicators.
6.8 Additional information *Optional*	The assessment criteria used by the National Survey of Upland Habitats (NSUH; Perrin *et al.*, 2014c) were reviewed in light of the review of the definition of Species-rich *Nardus* grassland in Ireland. In general, the majority of the criteria used did not need modification, with a number of exceptions. Modifications to the list of typical species are detailed in section 6.7. In terms of the vegetation structure criteria, the sward height criterion was changed from 'at least 25% of the sward to be between 5 and *50* cm in height' to 'at least 25% of the sward to be between 5 and *25* cm in height'. Stands of this grassland are typically low in structure, and a sward approaching 50 cm would likely be too tall and rank to support a diversity of forb species. The NSUH (Perrin *et al.* 2014c) and 'Review of four upland/uncommon grassland habitats' project (Hodd *et al*., in prep.) assessed Structure and functions of 6230 at a monitoring stop level, using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure. The NSUH primarily assessed SACs and has surveyed 20 SACs to date (2024). The 'Review of four upland/uncommon grassland habitats' project targeted sites where uncommon grassland types (including 6230) were likely, or known, to occur. Four sites surveyed by the NSUH were resurveyed by Hodd *et al*. (in prep.) for 6230. Hodd *et al*. (in prep.) mapped 9.64 ha of 6230 and recorded 25 Structure and functions assessment stops. Of these, 23 passed (92%) and two failed. One failure, at Bolingbrook Hill, Co. Tipperary, was due

	to insufficient high-quality indicator species and relatively low species diversity (fewer than 25 species in the plot). The other stop which failed the assessment, in the Galtees, Co. Tipperary, showed a low cover of forb species compared to graminoid species, possibly reflecting overgrazing (for full details see Hodd *et al.*, in prep.). Two other stops initially failed but were both marginal failures on sward height, and as the survey of these sites was carried out relatively early in the season, it was determined that the sward was likely to have not yet reached its full height across the stop area, so expert judgement was used to pass them. Perrin *et al*. (2014 a,b) also carried out assessments on 6230 habitat at two sites in the previous reporting period. However, while the area assessed was larger than that covered by Hodd *et al*. (in prep.) (14.10 ha compared to 9.64 ha), the number of assessment stops was much lower (4 compared to 25). The percentage of habitat assessed as being in good condition by Perrin *et al*. (2014a,b) is lower, at 25%. The areas assessed for Structure and functions in this reporting period by Hodd *et al*. (in prep.) and in the last reporting period by Perrin *et al*. (2014a,b) between them only represent 7.5% of the national area of habitat 6230, which is a small sample on which to base national values. The proportion of the entire resource assessed as being in good condition by these surveys is 3.0%, with 4.5% assessed as being in unfavourable condition. The condition of the remaining 92.5% is unknown. While the area included in these detailed surveys is below 25% of the total area, the overall condition of the habitat has been determined by combining the outcomes of the detailed surveys with other source material (e.g. the Coillte data mentioned in the next paragraph), such that we can state with a degree of confidence that the condition of 6230 is assessed as *Unfavourable-Inadequate*. To provide further information on the status of Structure and functions of this habitat, the Coillte Biodiversity Dataset areas that were included in the 6230 area total, albeit with a low certainty value, were reviewed, as these make up a significant proportion of the area included. Some of these were visited in the field by Hodd *et al*., who found insufficient 6230 to carry out assessments, although they were retained with a low certainty (1) and a low proportion of 6230 habitat (averaging around 50%, but sometimes as low as 10%). Although they were not assessed by assessment stops, many were seen to be in poor condition when visited. This was also evident when viewed on aerial imagery, with many sites showing heather or forest vegetation cover. On the basis of this review, it was considered that the *Favourable* assessments obtained from 23 of the 25 assessment stops in the Hodd *et al.* project alone were not representative of a large portion of the dataset. Balancing the findings from the recent survey (small in scale but with good detail) against the wider picture evident from a review of aerial imagery results in an expert judgement-led assessment of *Unfavourable-Inadequate*. In relation to trend, four sites surveyed by the NSUH (Mweelrea-Sheeffry-Erriff, Galtee Mountains, Mount Brandon and Carlingford Mountains) were resurveyed for Annex I grassland habitats by Hodd

	et al. (in prep.). 6230 was not recorded in the Galtee Mountains by the earlier survey but was recorded in the resurvey. In the other three sites, the 6230 assessed by the resurvey achieved better pass rates in Structure and functions assessments than the NSUH surveys. However, the number of sites assessed is considered too small to be able to say conclusively that the trend in Structure and functions is *increasing*, particularly when the large area of unassessed 6230 is considered. Following the guidelines from DG Environment (2023), and balancing the small but strong dataset from Hodd *et al*. (in prep.) showing positive change against evidence garnered remotely from a much larger area suggesting a decrease in Structure and functions, a trend of *stable* has been entered.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA02 Conversion from one type of agricultural land use to another (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Cotoneaster* sp.

7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* **b) Based mainly on extrapolation from a limited amount of data** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) The status of four uncommon grassland types in Ireland. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
7.4 Additional information *Optional*	Overgrazing (PA07) was the most common impact recorded across sites containing 6230 by Hodd *et al*. (in prep.), recorded at four of the eight 6230 sites fully surveyed. In the majority of cases, it was considered to be detrimental, although a certain level of grazing is required to maintain this habitat. Failures in Structure and functions assessment criteria were likely attributable to overgrazing in one of the two cases of stop failure. At one site, undergrazing (PA08) and lack of management (PA05) were considered to be an issue. At two sites, there was evidence of encroachment of scrub and bracken, indicated by the pressure PM07 'Natural processes without direct or indirect influence from human activities or climate change', in this case, natural succession resulting in species composition change. Invasion of *Cotoneaster* sp. had a negative impact on a small scale at one site (PI02). As the data from the current reporting period only represent a small proportion of the area of 6230, pressures and threats information recorded in the 2013-2018 reporting period (Perrin *et al.,* 2014a, b) was also used to inform the current reporting period. For the 2013-2018 reporting period, data on pressures were available for two NSUH sites: Slieve Mish Mountains SAC (002185) and Caha Mountains SAC (000093) (Perrin *et al*., 2014a, b). Only two pressures were ranked as either high or medium importance for 6230 habitat in the 2013-2018 reporting period (NPWS, 2019): 'Problematic native plants & animals' and 'Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)'. Both have additional evidence provided for their importance by the data collected during the current reporting period. The issue of problematic native plants such as Bracken and scrub has been incorporated into the 'natural succession' impact for this reporting period. The issues of inappropriate grazing (over- and undergrazing) and invasive alien species were reported as impacts of low importance in the previous monitoring report (NPWS, 2019). However, both overgrazing and undergrazing have been recorded as medium-influence pressures for the current reporting period due to the frequency of inappropriate grazing noted in 6230 sites surveyed in 2022, and the impact of the damage caused.

	PF05 'Sports, tourism and leisure activities', recorded as a low-importance impact in NPWS (2019), was retained as a pressure on 6230 habitat for the 2019-2024 reporting period due to the continued (and even growing) popularity of hiking in remote areas. The influence was recorded as low, as it tends to affect small areas locally. PA02 'Conversion from one type of agricultural land use to another', recorded as a low-importance impact in NPWS (2019), refers to the conversion of 6230 habitat into more intensively managed grassland areas. It has been retained as a pressure for the current reporting period, but its influence has been increased to medium for the current reporting period as, while infrequent, its damaging effects are catastrophic. PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' was recorded in NPWS (2019) as a threat due to the continued trend in Ireland of planting conifer plantations on marginal agricultural land and the issues associated with pre-planting surveys not recognising the 6230 habitat. It was given a low importance rating at that time due to a paucity of monitoring data, but this impact has been increased to a medium influence for the current reporting period, as additional pressure is likely to be placed on open habitats, including uplands, in efforts to reach the ambitious forestry targets proposed by the Irish government for 2030 and beyond (DAFM, 2023). Habitats most at risk are those that are not on peat soils >30cm deep, are in undesignated areas, or which are difficult to identify as Annex I habitat. 6230 habitat falls into a high-risk category: it does not occur on peat soils, over half of its known area in Ireland is outside of designated areas, and there is a high degree of difficulty in recognising the habitat without significant relevant expertise. Another reason for the upgrading of the threat level is that areas affected by forestry may often cover several hectares, and importantly, once planted, the effects on the habitat are largely irreversible. It should be noted that in 2024 DAFM published policy documents relating to afforestation, felling and reforestation (see, for example, Anon, 2024a; 2024b; Forestry Division, 2024). DAFM also undertakes environmental assessments, including Appropriate Assessment where necessary, as part of the forestry application and felling licensing processes. These assessments are aimed at reducing any negative environmental effects of forestry, especially on peatlands, wetlands, high-nature value grasslands (HNV) and in designated areas. However, some key challenges remain for 6230 grasslands. One issue is that, while 6230 is undoubtedly HNV grassland, it is often not readily recognisable as such, especially if it is tightly grazed; so even if an area of 6230 falls within the indicative HNV farmland map and is thereby subject to further assessment (see Anon., 2024a), it may not be recognised as Annex I habitat. Another issue is that 6230 grasslands are not found on peat soils and are likely to score highly on the R+N scoring system (used as a proxy for assessing if a site is adequately fertile to support conifers), meaning that they frequently will come through the 'Land types for afforestation' assessment as 'Eligible'. Once considered eligible, the next key risk is lack of recognition of the habitat, particularly if it is outside designated areas,

	if the surveys/assessments are not done in summer, and if they are not done by a suitably qualified ecologist who has the necessary expertise to recognise the habitat. Without recognition of the habitat being present, there will not be a trigger for additional screening. Thus, while the overall benefit of these new criteria and processes is acknowledged and welcomed, any potential positive effects on 6230 will only become clear in future national conservation assessments and may be limited for the reasons given. PE01 'Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels' was listed in NPWS (2019) as having occurred in the 2007-2012 reporting period but is not considered as a pressure in the current reporting period, or to be a future significant threat. Climate change and nitrogen deposition from the atmosphere have not been added as impacts, but they are both likely to affect the range and species composition of the habitat (EPA, 2017).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	*Recorded in the current monitoring period:* MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MI03 Management, control or eradication of other invasive alien species MM01 Management of habitats (other than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change *Additional measures reported from 2019 report:* MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities MI05 Management of problematic native species MK01 Reduce impact of mixed source pollution
8.7 Additional information *Optional*	Though no conservation measures targeted specifically at the 6230 habitat have been identified, there are a number of measures applied broadly to upland habitats which, if 6230 habitat is present, may contribute positively to the habitat. Conservation measures were recorded during the 'Review of four upland/uncommon grassland habitats' project by Hodd *et al.* (in prep.). Data from the 2019 monitoring report were also included, including information provided by NPWS, European Commission (EIP-Agri agriculture and innovation), Forest Service (2015) and NSUH (Perrin *et al*. (2014a, b). The most frequent conservation measure recorded on 6230 habitat in the current reporting period was MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', with appropriate grazing required to maintain or restore sites to favourable conservation status. Hodd *et al.,* (in prep.) noted that appropriate

	grazing does occur in some sites, but that modification of grazing levels is required in other cases to restore favourable conservation status. As noted below, the management regimes of most areas of 6230 habitat are driven by the landowner rather than by any formal management plan or policy acting specifically as conservation measures. MI03 'Management, control or eradication of other invasive alien species' relates directly to tackling invasive alien species, specifically *Cotoneaster* sp. MM01 'Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change' relates to halting changes due to species composition change, e.g. clearance of scrub/Bracken encroachment. A number of initiatives funded nationally and through the EU, such as European Innovation Project (EIPs), LIFE projects, NPWS Farm Plan scheme and the Agri-Climate Rural Environment Scheme (ACRES) (see below) are expected to have a beneficial effect on the 6230 habitat. However, without the results of specific targeted monitoring programmes, their influence on the Annex I habitat is difficult to quantify. The Wild Atlantic Nature LIFE IP is a LIFE project running in the northwest of Ireland. While the focus of the project is blanket bog, it is likely that any conservation management practices enacted under this scheme will benefit other habitats too, including 6230 grassland. The pilot phase for the WAN project begun during the current monitoring period, and results should become apparent in the 2025-2030 monitoring period. The following text is from the Results-based payments handbook for the project: "Central to the project is a pilot Results-Based Payment Scheme (RBPS) which will reward participating farmers for environmental services … by linking payments to the habitat quality. … Farmer payments relate to ecological quality for their peatland, grassland and/or woodland habitats. The higher the quality of these habitats, the higher the payment the farmers receive." The maintenance of extensive sheep grazing (reported under code MA03) is facilitated through the Department of Agriculture's Green, Low-carbon, Agri-Environment Scheme (GLAS) in the past, with the aim of protecting against both undergrazing and overgrazing (A. Bleasdale, NPWS, pers. comm.). GLAS has been superseded by the Agri-Climate Rural Environment Scheme (ACRES), which commenced officially in January 2023 (https://capnetworkireland.eu/schemes/acres/). There are two ACRES branches in which can be applied for, each with its own set of requirements: 1. General: Available nationally (outside of the high priority geographical area defined for the ACRES Co-operation approach) and offers a range of actions for individual farmers, both targeted and general. 2. Co-operation: Available to farmers in defined high priority geographical areas and involves results-based payments as well as bespoke farm and landscape actions. The ACRES Co-operation

	Project (ACRES CP) uses a qualitative approach whereby all forage land included in the scheme will be assessed using results-based score cards with incentives in place to increase scores and improve the landscape being farmed. (https://www.gov.ie/en/service/f5a48-agri-climate-rural-environment-scheme-acres/#what-the-agri-climate-rural-environment-scheme-acres-is). MB01 'Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation' is listed as a conservation measure that is currently being implemented to some degree, through the tightening up of DAFM's planting policies in relation to High Nature Value grasslands, peatlands and wetlands. It should be noted that in 2024 DAFM published policy documents relating to afforestation, felling and reforestation (see, for example, Anon, 2024a; 2024b; Forestry Division, 2024). DAFM also undertakes environmental assessments, including Appropriate Assessment where necessary, as part of the forestry application and felling licensing processes. These assessments are aimed at reducing any negative environmental effects of forestry, especially on peatlands, wetlands, high-nature value grasslands (HNV) and in designated areas. However, as noted in section 7.4, some key challenges remain for 6230 grasslands in relation to how difficult they are to recognise, their occurrence on mineral rather than peat soils, and their likely high scoring on the R+N scoring system. Thus, while the overall benefit of these new criteria and processes is acknowledged and welcomed, any potential positive effects on 6230 will only become clear in future national conservation assessments and may be limited for the reasons given. It should be recognised that the management regimes of most areas of 6230 habitat are driven by the landowner rather than by any formal management plan or policy; therefore, the continued operation of the management regimes currently in place is not guaranteed across the entire habitat. Furthermore, these schemes do not include targeted measures specific to 6230 habitat; however, management prescriptions might be included for the broader upland area which includes the 6230 habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable.* Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as the range is expected to remain stable in the future, based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range is therefore *Good*.	

	Short-term trend direction of Area is assessed as *decreasing*. Current area is 11-25% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Bad*. Future trend of Area is assessed as *negative*, as area is expected to decrease, based on the balancing of the threats and conservation measures currently in place. Future Prospects of Area are therefore *Bad.* Current Structure and functions are assessed as *Unfavourable-Inadequate* based on expert judgement as only 7.5% of the national resource habitat was assessed. Short-term trend direction is *stable* for habitat that is in good condition. Future trend of Structure and functions is assessed as *stable*, as the current pressures and threats balanced with conservation measures are expected to remain more or less in balance, with neither further deterioration nor improvement expected. Future prospects of Structure and functions are therefore *Poor*. Sections 8.6 and 8.7 list conservation measures that are actively being implemented or recommended across the 6230 resource in the country. If the recommendations were to be fully implemented, the future trend of Area could be assessed as *stable*. However, it is impossible to be certain that sufficient recommended measures will in fact be carried out over the next monitoring period. Therefore, the future trend of Area for this monitoring period is assessed as *negative*. Implementation of the Nature Restoration Law in the next reporting period may have some positive effects on 6230 habitat area.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***

	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Unfavourable-Bad* in this reporting period, as it was in the previous reporting period, due to recorded losses in area. The Conservation Status of Structure and functions is *Unfavourable-Inadequate* in this reporting period, a change from *Unfavourable-Bad* from the previous reporting period. There is limited evidence of a genuine improvement in four of the sites that were surveyed in phases 1-3 of the NSUH (2010 to 2012) and resurveyed by Hodd *et al*. (in prep.). All four achieved better assessment results in 2022 (12 out of 12 stops passed in 2022, compared to 3 out of 8 passing in 2010-2012). As this recorded improvement is based on a very limited number of stops and sites, the overall trend in Structure and functions was evaluated as *stable* rather than *improving*. The Conservation Status of Future prospects is *Unfavourable-Bad* as Area was evaluated as *Unfavourable-Bad* and the pressures recorded are expected to continue into the future. The Overall Conservation Status was assessed as *Unfavourable-Bad*, as it was during the last reporting period. The status of *Unfavourable-Bad* during the current reporting period is due to the current area of 6230 habitat being 11-25% less than the FRA, and an assessment of *Bad* for the Future prospects of the habitat in the context of the pressures operating on it. Trend in Overall Conservation Status was assessed as *Deteriorating* in this reporting period, a decline since the last reporting period. This is due to the trend in Area being assessed as *decreasing* for this reporting period, a change from *stable* in the last reporting period. Short-term trend for Area was based on the 'Review of four upland/uncommon grassland habitats' project (Hodd *et al*., in prep.) for this reporting period, and the NSUH Phase 4 data for the previous reporting period (2013-2018). It should be noted however that, between them, those surveys covered a relatively small proportion (11.5%) of the total area of 6230 habitat recorded in Ireland.	

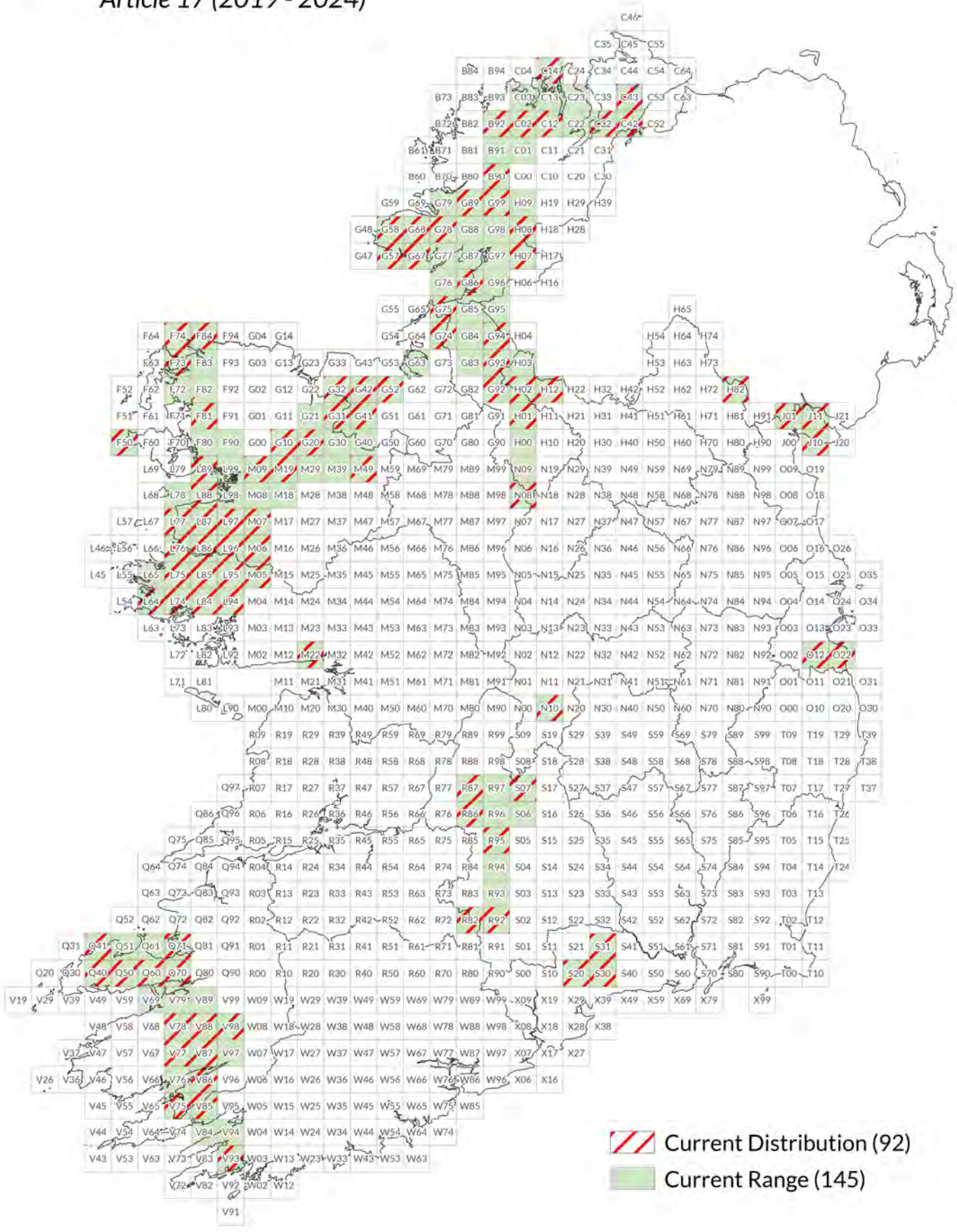
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.524 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile with QIs. The total area contributed by polylines and points (535 m^2) was negligible at the scale required (<0.001 km^2) and they were excluded.	

	A union was carried out between the polygon distribution file and the SAC shapefile. The area of each polygon in the union ('Union_area') was calculated in GIS and the percentage of 6230 habitat in each polygon ('PER_ANNEX') was then multiplied by the Union_area to obtain the area of 6230 habitat in the polygon. A series of sorts was then carried out in Excel to calculate the area of 6230 habitat within the network, and within the SACs for which 6230 is a QI. The area given in section 11.1 is the total area of 6230 habitat in SACs in the country, including some SACs where 6230 is not listed as a qualifying interest (QI). The area of 6230 within the Natura 2000 network where it is listed as a QI is 0.834 km^2. The surface area of 6230 habitat within the Natura 2000 network has decreased since the last reporting period. This mainly is due to a refinement of the definition of the habitat in Ireland, as well as improved data contributing to an adjustment of area totals. A small amount of anthropogenic loss of 6230 habitat was reported in the current reporting period in Bolingbrook Hill SAC, where undergrazing and lack of management have led to the development of rank grassland. The short-term trend of the 6230 habitat in good condition within the SAC network is taken to be *stable*, with the same trend as the 6230 habitat nationally (section 6.4). A separate evaluation of Structure and functions could not be made of areas inside and outside of the SACs as most of the 2022 data was recorded within SACs, and areas outside of SACs were assessed in much less detail.

12 Complementary information *N/A*

Species-rich Nardus grassland* (6230)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)**
1.2i Habitat short name	***Molinia* meadows**
1.3i Habitat description	The Annex I habitat 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) is represented in Ireland by both fen and grassland communities on nutrient-poor soils. The 6410 habitat is either managed as traditional hay meadows (typically cut once a year in late summer or autumn with the hay crop removed) or more usually as extensive pasture. Within Ireland, *Molinia* meadows occur in lowland plains on neutral to calcareous gleys, sometimes with a marl layer beneath the surface, or on peaty soils both in lowland and upland situations. *Molinia* meadows generally have a central to north-western distribution in Ireland. *Cirsium dissectum* is one of the key indicator species for the habitat, and the distributions of 6410 and *Cirsium dissectum* are similar in Ireland. The Annex I habitat is less common in the east and south of the country, with only scattered instances recorded within those regions. The 6410 habitat is composed of a few distinct communities belonging to the Junco-Molinion. In the Irish Vegetation Classification system, the community that corresponds to the best examples is GL1C: *Molinia caerulea – Succisa pratensis* grassland, while less species-rich examples fall within GL1A *Juncus acutiflorus – Holcus lanatus* grassland or GL1D *Molinia caerulea – Potentilla erecta – Agrostis stolonifera* grassland (Perrin, 2021). In other classification systems, 6410 habitat falls into the *Carex panicea – Festuca rubra* community of Heery (1991) and the M24: *Molinia caerulea – Cirsium dissectum* fen meadow of Rodwell (1991).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1987-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution map was compiled from the sources listed in section 3.4. The main sources of 6410 polygons were: the 2015-17 Grassland Monitoring Survey (GMS 2015-17; Martin *et al.*, 2018), the 2021-23 Grassland Monitoring Survey (GMS 2021-23; Martin *et al.*, in prep.), the 2007-12 Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.*, 2013), the National Fen Survey (Brophy *et al.*, in prep.), the Pilot Fen Survey (O'Neill *et al.*, 2023) and the Callows survey (Martin *et al.*, 2022). Heery & Keane (1999), Browne *et al.* (2002), Anon. (2008), Daly & Barron (2014), O'Neill & Martin (2015), Daly (2016) and Galway County Council (2017) also provided polygons for the distribution map. The distribution map also utilised points digitised by Bleasdale (1995), Conaghan (1995), Conaghan & Fuller (2005), Daly & Barron (2014), Martin *et al.* (2018), Moran (2005) and O'Neill *et al.* (2013). An area was assigned to points, as follows: Where habitat was noted by Martin *et al.* (2018) or O'Neill *et al.* (2013) to be below the project minimum mapping area of 400 m^2, an area of 200 m^2 was assigned to the point. The remaining points had been reviewed for the previous monitoring period's report (NPWS, 2019) and a mean value of 0.35 ha had been assigned to each of them. These values were left unchanged for the current report. No points that overlapped with a polygon were included in the points distribution shapefile. A working file containing all polygons and points considered for 6410 was initially collated from the sources listed in section 3.4. A certainty rating system was used to rate the reliability of the datasets, ranging from 3 to 1 from high to low certainty (corresponding to definitely/ probably/possibly 6410). Data sources listed in section 3.4 that are known to represent the 6410 habitat (e.g. recent surveys focusing on Annex I grassland habitats) were assigned a high certainty=3. Data sources that probably include the 6410 habitat were assigned a certainty=2, while those sources that possibly include the 6410 habitat were assigned a low certainty=1. No dataset that is over 10 years old was assigned a certainty=3 due to the uncertainty that the grassland habitat recorded over 10 years ago is still present. Further scrutiny was applied at a more detailed level to determine if particular records within the datasets represented the habitat, using field surveyor notes such as species recorded, or whether the area was walked, viewed or determined by remote imagery. A certainty value of 0 was assigned to records that were deemed not to represent 6410. All polygons or points with certainty 1 to 3 were used to map the distribution of the 6410 habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*

3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**Polygons:** Anon. (2008) Limerick Northern Distributor Road: Supplementary Constraints Information. Unpublished report by Roughan & O'Donovan for Clare County Council. Barron, S. & Perrin, P. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished Report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Bourke, D., Hochstrasser, T., Nolan, S. and Schulte, R. (2007) Historical Grassland Turboveg Database Project: 2067 Relevés Recorded by Austin O'Sullivan 1962-1982. Database reference Nos: 25604-28543. Unpublished report for the National Parks and Wildlife Service, Dublin. Brophy, J. *et al*. (in prep.) National Fen Survey 2021-2025. Report for NPWS, Department of Housing, Heritage and Local Government. Browne, A., Dunne, F. and Roche, N. (2002) A preliminary study of the Upper Shannon floodplain. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin. Crowley, W., Vanmechelen, A., O'Sullivan, J., Crushell, P. & Foss, P. (2023) County Mayo Wetlands Field Survey II. Report prepared for Mayo County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P.J. (2023) County Leitrim Wetlands Field Survey II 2023. Report prepared for Leitrim County Council. Daly, O.H. (2016) Surveys of possible Marsh Fritillary sites and habitat in the mid-west (Roscommon and Longford), Draft report. Unpublished report to National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. Daly, O.H. & Barron, S. (2014) Surveys of possible Marsh Fritillary sites and habitat in Cos Louth, Meath and Monaghan, Final report. Unpublished report to National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project.

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Additional polygons digitised:

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From notes on internally held files relating to three SACs.

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Additional references used to inform the assessment:

Anon. (2024a) Environmental Requirements for Afforestation, Department of Agriculture, Food & the Marine, Ireland.

Anon. (2024b) Land types for Afforestation: Soil & fertility, Department of Agriculture, Food & the Marine, Ireland.

	Forestry Division (2024) Afforestation Scheme 2023 – 2027, Department of Agriculture, Food & the Marine, Ireland. Anon. (2020) National Parks and Wildlife Service Farm Plan Scheme, Terms and Conditions Document. Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland. National Parks and Wildlife Service. DAFM (2020) European Innovation Partnership Scheme. https://www.gov.ie/en/service/18a855-european-innovation-partnership-scheme/. Accessed 25/11/2024. DAFM (2024) Agri-Climate Rural Environment Scheme 'ACRES' https://www.gov.ie/en/service/f5a48-agri-climate-rural-environment-scheme-acres/. Accessed 25/11/2024. DAFM (2023) Ireland's Forest Strategy (2023-2030). Forest Service, Department of Agriculture, Food and the Marine. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien & F. McGovern. EPA, Wexford. NBDC (2021) All-Ireland Pollinator Plan 2021-2025. https://pollinators.ie/aipp-2021-2025. Accessed 25/11/2024. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks & Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Rodwell, J.S. (ed.) (1991) *British plant communities Volume 2: Mires and heaths*. Cambridge Community Press, Cambridge.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***32,300 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***3.58%***
	b) Estimated Maximum	***3.58%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 33,500 km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: <u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 6410 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool.

The figure of 323 10x10 km grid cells given in section 4.1 is higher than the last monitoring period (207 cells) due to additional information obtained from new surveys. Notable reported expansion of the range occurred in Clare and across the central swathe of the country, due to new surveys such as the fen surveys (Brophy et al., in prep., O'Neill et al., 2023) which alone contributed an additional 46 new 10x10 km grid cells to the distribution, and the Callows survey (Martin et al., 2022). Thus, reported range expansion is due to new information rather than development of new areas of habitat.

Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). As noted in NPWS (2019), in counties Cork and Waterford, area losses recorded during the 2013-2018 reporting period led to a contraction in the range by nine 10x10 km grid cells. These losses were due to the anthropogenic pressures of agricultural intensification, forestry, and abandonment. During the current reporting period, 6410 was recorded in two of those lost 10x10 km grid cells, bringing them back into the range again, but five more grid cells were lost from the range in Tipperary, Kildare, Laois and the Cork/Limerick border, again due to agricultural intensification and forestry. These losses are responsible for a net contraction of the range by twelve 10x10 km grid cells since 2013. This is a 3.58% loss in range in 12 years, which is equivalent to a loss of 0.30% of 6410 habitat per annum.</td></tr>
</table>

	Overall, the number of 10x10 km grid cells in the range (323) is 116 cells higher than the last monitoring period, a significant increase of 56% on the 2019 value; however, the change is almost entirely due to improved knowledge and more accurate mapping of the habitat since the previous reporting period. A number of small gains did occur locally in Mayo and Laois, but these did not affect the range in any way. The Favourable Reference Range (FRR) has been increased since the last reporting period (NPWS, 2019) due to improved knowledge and now consists of the current range plus the twelve grid cells lost since 2013, i.e. 335 grid cells. The current range is therefore 3.58% (i.e., less than 10%) below the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1987-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***8.20 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	

5.7 Short-term trend Direction	*stable / increasing / **decreasing** / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***15%***
	b) Estimated Maximum	***15%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / **minimum**/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ ***between 11% and 25% smaller than the FRA*** ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 1987 and incorporates data from surveys that have taken place since then, up to and including data obtained during the current reporting period, notably the Grassland Monitoring Survey (GMS) 2021-23 (Martin *et al.*, in prep.) which contributed 183 ha of 6410 to the dataset; the Pilot Fen Survey (O'Neill *et al.*, 2023) and National Fen Survey 2021-23 (Brophy *et al.*, in prep.) which contributed 182 ha; County Wetland Surveys (Wetland Surveys Ireland, various years) – 27 ha; Callows Grasslands Survey (Martin *et al.*, 2022) – 18 ha; and NPWS Farm Plans/Farm Plans Grassland Monitoring Project – 14 ha. See section 3.4 for full list of resources. There are almost certainly still areas of unmapped 6410 habitat within the country, hence the area value entered is a minimum. Favourable Reference Area (FRA) was not determined exactly. However, it is deemed to be 11-25% greater than the current area, given that anthropogenic losses have occurred since the Directive came into force, and there is no evidence that corresponding increases have taken place since then to significantly offset losses. The GMS 2021-23 visited 37 of the 113 sites with 6410 that had been previously surveyed by the 2007-12 Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.*, 2013), plus an additional five sites that had not been surveyed before. The area of 6410 had been reduced at 16 of the 42 sites surveyed in 2021-23 due to anthropogenic factors, such as forestry, agricultural improvement or abandonment. Two of the sites no longer contained any 6410: one had been agriculturally improved, and the other had been planted with forestry. Another ISGS site, not visited by the GMS 2021-23, was deemed lost due to agricultural improvement, based on a review of aerial imagery. Under-management (e.g., undergrazing, lack of mowing, scrub encroachment) resulted in habitat loss at six of the sites. Some of this under-management, particularly where fields are usually mown, was due to prolonged flooding, possibly a consequence of climate change, which meant that some fields could not be mown on an annual basis, resulting in a transition to wetter habitats such as swamp, or development of more rank, tussocky vegetation. Such losses are often redeemable through the reinstatement of appropriate management, provided hydrological conditions are suitable. Five areas incurred area	

	losses due to agricultural intensification, with overgrazing, fertiliser application and drainage all cited as reasons for habitat loss. Short-term trend in Area was deemed to be *decreasing* because the area of 6410 had been reduced at 16 of the 42 sites surveyed in 2021-23 due to anthropogenic factors. The total recorded area of 6410 lost since the baseline survey was 32.12 ha (0.32 km^2), which is 15% of the original area mapped in the baseline survey of 2007-2012, calculated by expressing the area lost as a percentage of the original area. As the survey interval between the baseline survey and the 2021-23 survey ranged between 10 and 14 years, an average interval of 12 years was used to calculate the per-annum loss, which is 1.25%. This area loss is taken to be the minimum, with other undocumented losses likely to have taken place in sites not surveyed since the previous monitoring period. If the 15% total loss in area is applied to the 6410 area of 8.20 km^2 reported in section 5.2c above, the total reported loss in area nationally during the current and previous reporting period would be 1.23 km^2. The difference in habitat extent between this reporting period and the last is primarily due to additional areas of 6410 that were found during other surveys. Differences (losses) were also ascribed to genuine change from anthropogenic impacts such as forestry, agricultural improvement and under-management. For the previous monitoring report, the points dataset was reviewed using remote imagery to estimate the area occupied by 6410 at those points. Following this review, a mean value of 0.35 ha was assigned to each point, except where areas were noted to be less than 400 m^2, in which case an area of 200 m^2 was assigned. These areas were retained and not revised for this monitoring report.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***5.30 km²***
		Maximum	***5.30 km²***
	b) Area in not-good condition	**Minimum**	***2.90 km²***
		Maximum	***2.90 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		

6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species is the same as that used in the 2013-2018 reporting period, see list of species below. One change was made to the assessment criteria. Formerly, only litter cover was examined but this has been changed to examine both depth and cover of litter, and a monitoring stop will only fail the litter criterion if it has more than 25% litter cover and more than 5 cm litter depth. All taxa included in the current list of typical species are as follows: *Achillea ptarmica, Carex echinata, Carex flacca, Carex nigra, Carex panicea, Carex pulicaris, Carex viridula, Carum verticillatum, Cirsium dissectum, Crepis paludosa, Equisetum palustre, Filipendula ulmaria, Galium palustre, Galium uliginosum, Juncus acutiflorus, Juncus articulatus, Juncus conglomeratus, Lathyrus palustris, Lotus pedunculatus, Luzula multiflora, Mentha aquatica, Molinia caerulea, Ophioglossum vulgatum, Potentilla anglica, Potentilla erecta, Ranunculus flammula, Succisa pratensis, Viola palustris, Viola persicifolia*, and all native orchids.
6.8 Additional information *Optional*	The Grassland Monitoring Survey 2021-23 (Martin *et al*., in prep.) surveyed and assessed 180.85 ha of 6410 habitat, which represents 22.1% of the national 6410 resource. The same assessment methodology was followed for this monitoring report as for the last. The approximate area of each site with *Favourable* Structure and functions (i.e. good condition) was calculated based on the percentage of monitoring stops that passed the assessment. The total area in good condition was obtained by adding together the favourable area of each of the surveyed sites. The proportion in good and not-good condition was then scaled up to the national level to estimate the national area in each category. The Structure and functions assessment examined the following attributes: number of positive indicator species in, or in the vicinity of, 2x2m assessment plots; presence and cover of non-native species; presence and cover of negative species (including species indicative of agricultural improvement or transition to swamp habitat); encroachment of problematic native species such as bracken and scrub; sward height; litter cover and depth; bare soil cover; grazing and disturbance; and the forb-to-graminoid ratio. The forb-to-graminoid ratio was the criterion that had the highest rate of failure, with 25% of stops failing to meet the minimum 30% threshold. Litter cover and depth was the next most failed criterion, at 80% of stops,

	indicating areas of habitat that were not managed appropriately, allowing litter to build up. Insufficient positive indicator species closely followed litter as the next most failed attribute, failing in 83% of stops when high-quality species were lacking, and in 85% of stops where the overall count of positive indicators (high-quality and other species) failed to reach the seven-species threshold. The percentage of the 6410 habitat with *Favourable* Structure and functions has remained more or less stable, from 63% in the last reporting period (NPWS, 2019) to 64.6% in the current reporting period. Trend is reported as *stable*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA02 Conversion from one type of agricultural land use to another (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	High
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	High
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PM02 Flooding	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R04205 *Cotoneaster horizontalis;* R04215 *Cotoneaster integrifolius;* R04224 *Cotoneaster microphyllus;* R04246 *Cotoneaster simonsii*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures were recorded during 2021-2023 field surveys for the Grassland Monitoring Survey (GMS) 2021-23 (Martin *et al*., in prep.). Additional pressures have been added from expert knowledge of the issues that affect 6410 habitat nationally.
7.4 Additional information *Optional*	As part of the GMS 2021-23, Martin *et al*. (in prep.) recorded all pressures in the 6410 habitat they surveyed, on a field-by-field basis. The percentage of 6410 habitat in each field that was negatively impacted by the pressure was recorded, together with its influence (high, medium or low). The total area impacted by each pressure could thus be calculated. The pressures were ranked according to the percentage of total surveyed area they impacted and the influence of the pressure. Negative impacts comprised either area loss or a deterioration in structure and functions. The results showed that the highest negative impact (by area) recorded on surveyed areas of 6410 was undergrazing (PA08), affecting 13% of the area. Inadequate grazing is a particular challenge in this habitat given the tendency for *Molinia caerulea* to form tussocks if under-managed, resulting in swards which become difficult to deal with due to the tussocks, and also in reductions in species diversity. This was also the most frequent impact recorded (12 out of 42 sites). A further 8% of the surveyed area was impacted by total abandonment (PA05), leading to rank swards and encroachment by non-grassland habitats such as scrub. This was the second most frequent impact recorded (8 out of 42 sites). Cumulatively, inappropriate management under agriculture (pressure codes beginning with PA_), either under-management or over-intensive management, had a high impact on 29% of the area of 6410 surveyed. The impact of prolonged flooding (PM02) was noted at just one site, but it affected a significant area, 11.6 ha, comprising over 6% of the total area of the habitat surveyed across all 42 sites. PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' was recorded in NPWS (2019) as a threat due to the continued trend in Ireland of planting conifer plantations and broadleaves on marginal agricultural land and the issues associated with pre-planting surveys not recognising the 6410 habitat. It was given a high importance rating at that time and this remains the case, at least partly due to efforts to reach the ambitious forestry targets

	proposed by the Irish government for 2030 and beyond (DAFM, 2023) and the issues listed here. Habitats most at risk are those that are not on peat soils >30cm deep, are in undesignated areas, or which are difficult to identify as Annex I habitat. 6410 habitat falls into a high-risk category: it does not always occur on peat soils, over half of its known area in Ireland is outside of designated areas, and there is a high degree of difficulty in recognising the habitat without significant relevant expertise. Another reason for the high threat level is that areas affected by forestry may often cover several hectares, and importantly, once planted, the effects on the habitat are largely irreversible. It should be noted that in 2024 DAFM published policy documents relating to afforestation, felling and reforestation (see, for example, Anon, 2024a; 2024b; Forestry Division, 2024). DAFM also undertakes environmental assessments, including Appropriate Assessment where necessary, as part of the forestry application and felling licensing processes. These assessments are aimed at reducing any negative environmental effects of forestry, especially on peatlands, wetlands, high-nature value grasslands (HNV) and in designated areas. However, some key challenges remain for 6410 grasslands. One issue is that, while 6410 is undoubtedly HNV grassland, it is often not readily recognisable as such, especially if it has become rank; so even if an area of 6410 falls within the indicative HNV farmland map and is thereby subject to further assessment (see Anon., 2024a), it may not be recognised as Annex I habitat. Another issue is that some 6410 grasslands are not found on peat soils and are likely to score highly on the R+N scoring system (used as a proxy for assessing if a site is adequately fertile to support conifers), meaning that they frequently will come through the 'Land types for afforestation' assessment as 'Eligible'. Once considered eligible, the next key risk is lack of recognition of the habitat, particularly if it is outside designated areas, if the surveys/assessments are not done in summer, and if they are not done by a suitably qualified ecologist who has the necessary expertise to recognise the habitat. Without recognition of the habitat being present, there will not be a trigger for additional screening. Thus, while the overall benefit of these new criteria and processes is acknowledged and welcomed, any potential positive effects on 6410 will only become clear in future national conservation assessments and may be limited for the reasons given. The issue of fragmentation is a serious one for grasslands, as it is for many other habitats, and of course active management is absolutely necessary for the continued existence of a species-rich *Molinia* meadow sward. The stated aim of preservation of HNV grasslands is welcome in the updated guidance and procedures published by DAFM in 2024. However, changes in habitat configuration associated with plantations in formerly open areas have resulted in a reduction in the connectivity and accessibility of some remaining grasslands for the purposes of farming and other management. Fragmentation and isolation reduces the intrinsic ecological value of the remaining pockets of grassland, and because they become more difficult to access, they are at risk of succession towards scrub or heath. This is a risk for grassland habitats generally, and field observations suggest that 6410 is among the habitats particularly affected. Reasonable

	connectivity and 'farmability' must be retained in habitat pockets excluded from forestry. Further research is needed in order to quantify this threat. Losses of 6410 habitat were recorded at 14 sites during the current reporting period. These were caused by a range of pressures. Of the two most severe cases, where 100% loss of 6410 habitat at the site occurred, one was caused by conversion to broadleaf forestry planting, and the other was due to agricultural improvement. Of the other 12 sites where habitat loss occurred between 2019 and 2024, under-management and lack of suitable management (e.g., undergrazing, lack of mowing, scrub encroachment) resulted in habitat loss in six of the sites. Some of this under-management, particularly where fields are usually mown, was due to prolonged flooding, possibly a consequence of climate change, which meant that some fields could not be mown on an annual basis, resulting in a transition to wetter habitats such as swamp, or development of more rank, tussocky vegetation. It is expected that reinstatement of mowing should reverse some or all of this impact, subject to suitable hydrology for habitat maintenance. Five areas incurred area losses due to agricultural intensification, with overgrazing, fertiliser application and drainage all cited as reasons for habitat loss. The last site incurred area loss due to construction of a farm track. Pressures did not always result in area losses, but they did impact on structure and functions in several ways, mainly affecting the presence of typical species, sward height, and the presence of scrub species in the vicinity. Some impacts, such as flooding (PM02) and invasion by *Cotoneaster* spp. (PI02), have a high impact locally, but on a national scale have a lower influence. These two impacts are therefore listed in section 7.1(d) as medium-influence impacts. Climate change and nitrogen deposition from the atmosphere have not been added as impacts, but they are both likely to affect the range and species composition of the habitat (EPA, 2017).

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation MI05 Management of problematic native species
8.7 Additional information *Optional*	Conservation measures were selected and ranked based on the frequency of occurrence, using the data gathered during the Grassland Monitoring Survey (GMS) 2021-23 (Martin *et al.*, in prep.). As part of the GMS 2021-23, Martin *et al.* (in prep.) recorded active (currently being implemented) and recommended (not yet implemented but would benefit the habitat) conservation measures

	in the 6410 habitat they surveyed, on a field-by-field or management unit (e.g. a series of interconnected fields that cattle can easily move between) basis. In addition, the current level of management was broadly assessed, e.g., appropriate, too intense or not intensive enough. Recording the current level of management helped inform the conservation measures, as well as the status of the measure (i.e., active or recommended). So, for example, if grazing was currently being carried out, was maintaining the 6410 habitat and not negatively impacting it (i.e., was being carried out at an appropriate level), then the corresponding conservation measure recorded was MA03 'Maintain existing extensive agricultural practices and agricultural landscape features', and its status was 'Active'. If management levels needed to be adjusted, then the corresponding conservation measure was MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', and its status was 'Recommended'. The conservation measures recorded included routine farm activities such as grazing and mowing, which form part of day-to-day farm management but have a positive effect on the conservation status of the 6410 habitat, as well as specific measures directly aimed at improving the conservation status of the habitat, such as removal of invasive species. Conservation measures were ranked based on their frequency of occurrence and the area over which they are implemented across all sites in which 6410 was assessed. The measures listed mainly take the form of maintaining the management practices currently in place that benefit the 6410 habitat. For 6410 in Ireland, this usually takes the form of cattle grazing (recorded in 57% of the sites surveyed), although other grazing livestock such as horses, donkeys and sheep were also recorded, and management by mowing was recorded at 25% of sites. In all, 54% of the 160 management units assessed were deemed to be managed at an appropriate level, and the active conservation measure MA03 'Maintain existing agricultural practices' was recorded. Just under 4% of management units were judged to be managed too intensively, and the measure MA05 'Adapt grazing and mowing practices' was recommended. A further 41% were deemed to be under-managed, either due to insufficient grazing/mowing or abandonment of management. In most of these cases, management was occurring but was insufficient to maintain good vegetation structure, so the measure MA05 'Adapt grazing and mowing practices' was recommended. MA04 'Reinstate appropriate agricultural practices' to address abandonment was recommended where management had ceased. MA13 'Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)' was recommended for four management units that were too intensively managed and in which drainage was an ongoing issue. The measure MI05 'Management of problematic native species', mainly taking the form of scrub clearance, was recorded as actively being implemented at one site and was recommended in two other

	sites. MI03 'Invasive species removal' (in this case *Cotoneaster* spp.) was recommended at one site. It should be recognised that the management regimes of most 6410 grassland habitats are driven by the landowner rather than by any formal management plan or policy; therefore, the continued operation of the management regimes currently in place is not guaranteed. In some cases, the maintenance of extensive cattle grazing (and other conservation management actions) is undertaken through various agri-environment schemes. The most successful schemes are generally those that are results-based, allowing the farmers to work towards an end point using the methods they deem appropriate. Martin *et al*. (in prep.) noted that there have been many nature-positive initiatives implemented within Ireland over the last decade, notably the ACRES agri-environment scheme (DAFM, 2022), the All-Ireland Pollinator Plan (NBDC, 2021), the Burren Programme (which started as an EU LIFE project), the Farming for Nature initiative which was founded under the auspices of the Burrenbeo Trust (www.farmingfornature.ie), the EU Innovation Partnership for Agriculture Productivity and Sustainability (EIP-AGRI – DAFM, 2020), EU LIFE programmes such as Lough Carra LIFE (www.loughcarralife.ie), and the NPWS Farm Plan Scheme (Anon., 2020). These are undoubtedly having a positive impact across grassland habitats in general, but without the results of specific targeted monitoring programmes, their influence on the Annex I habitat is difficult to quantify. MB01 'Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation' is listed as a conservation measure that is currently being implemented to some degree, through the tightening up of DAFM's planting policies in relation to High Nature Value grasslands, peatlands and wetlands. It should be noted that in 2024 DAFM published policy documents relating to afforestation, felling and reforestation (see, for example, Anon, 2024a; 2024b; Forestry Division, 2024). DAFM also undertakes environmental assessments, including Appropriate Assessment where necessary, as part of the forestry application and felling licensing processes. These assessments are aimed at reducing any negative environmental effects of forestry, especially on peatlands, wetlands, high-nature value grasslands (HNV) and in designated areas. However, as noted in section 7.4, some key challenges remain for 6410 grasslands in relation to how difficult they are to recognise, their occurrence on mineral rather than peat soils, and their likely high scoring on the R+N scoring system. Thus, while the overall benefit of these new criteria and processes is acknowledged and welcomed, any potential positive effects on 6410 will only become clear in future national conservation assessments and may be limited for the reasons given.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** /* Bad */ Unknown*
	b) Area	*Good / Poor / **Bad** / Unknown*
	c) Structure and functions	*Good / Poor / **Bad** / Unknown*
9.2 Additional information *Optional*	Range has decreased by less than 1% per annum since 2013, with the magnitude of the known loss 0.30% per annum. Current range is 3.52% below the Favourable Reference Range. Conservation status of Range is therefore *Unfavourable-Inadequate*. Short-term trend direction of Range is assessed as *decreasing*. Future trend of Range is assessed as *negative*, as the range is expected to decrease based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Poor*. Area has decreased by more than 10% since 2013, with the magnitude of the known loss 1.25% per annum. Short-term trend direction of Area is assessed as *decreasing*. Current area is 11-25% less than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Bad*. Future trend of Area is assessed as *negative*, as the area is expected to decrease based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Area are therefore *Bad*. Current Structure and functions are assessed as *Unfavourable-Bad* as >25% of habitat is in not-good condition. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. Short-term trend direction is *stable* (for habitat that is in good condition). Future prospects of Structure and functions are therefore *Bad*. Section 8.6 and 8.7 detail the conservation measures that are actively being implemented, or recommended to be implemented, across the 6410 resource in the country. If the recommendations were to be implemented, the future trends of Range and Area could be assessed as *stable* rather than *negative*. However, it is impossible to be certain that sufficient recommended measures will be carried out over the next monitoring period, so the future trends remain *negative*. Implementation of the Nature Restoration Law in the next reporting period is predicted to have some positive effects on 6410 habitat area. It should be noted that programmes such as ACRES and the NPWS Farm Plan Scheme are counterbalancing negative trends in some areas, particularly where no conservation management had previously been implemented, and the Nature Restoration Law is expected to prove beneficial to the habitat as a whole.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Overall Conservation Status was assessed as *Unfavourable-Bad*, as it was during the last reporting period. The status of *Unfavourable-Bad* during the current reporting period is due to the current area being more than 10% below the Favourable Reference Area, and the fact that >25% of the surveyed area had Structure and functions that were *Unfavourable* (35.4% of the habitat was found to be in not-good condition). Overall trend in Conservation Status was assessed as *deteriorating* during the current reporting period, as some areas of the habitat had been lost due to impacts such as agricultural intensification, forestry and undergrazing. These impacts are expected to continue into the future. This continues the negative trend reported during the 2013-2018 reporting period. Although the range of this habitat overall has increased since the last reporting period due to improved knowledge, there have been genuine, irreplaceable losses of 6410 habitat, some at the edges of the range, due to anthropogenic pressures such as forestry planting and intensification for agriculture.	

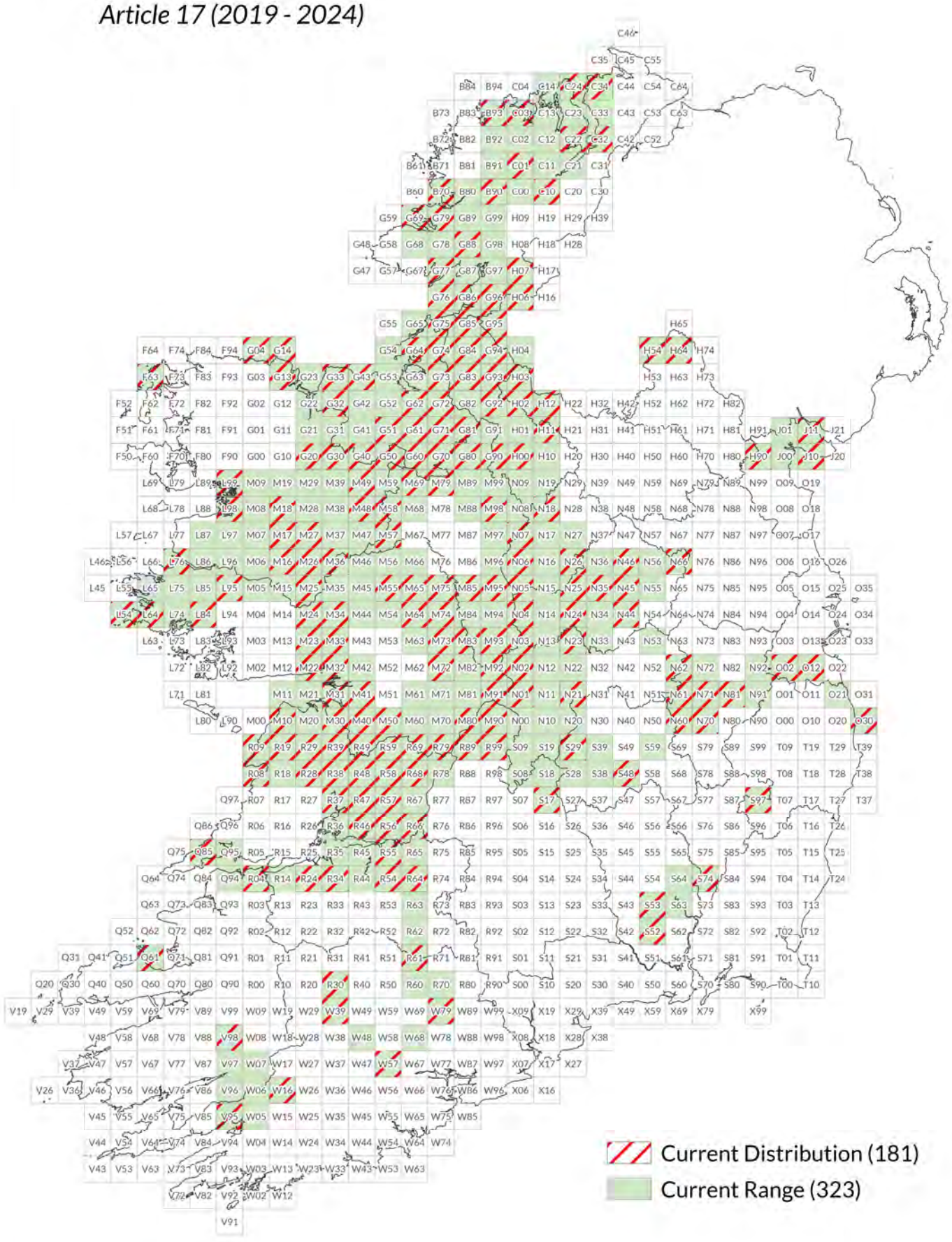
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.79 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by examining any overlap between the distribution shapefiles and the SAC shapefile. For polygons, this was done by carrying out a GIS union between the polygon distribution file and the SAC shapefile. The area of each polygon in the union ('Union_area') was calculated in GIS and the percentage of 6410 habitat in each polygon ('Per_Annex') was then multiplied by the Union_area to obtain the area of 6410 habitat in the polygon. A series of sorts was then carried out in Excel to calculate the area of 6410 habitat within the network, and within the SACs for which 6410 is a QI.	

	The points distribution shapefile consisted of nine points, each of which was checked for overlap with SACs. The area of overlap due to points was added to the area contributed by polygons. The area given in section 11.1 is the total recorded area of the 6410 habitat in SACs in the country, including 47 SACs where the habitat is not listed as a qualifying interest (QI). The area of 6410 that occurs in an SAC where it is listed as a QI (17 SACs) is 2.57 km^2, which represents 68% of the total area of 6410 in the SAC network. The figure given in section 11.1 is 1.66 km^2 higher than that given in the past monitoring report (NPWS, 2019). This is due to the discovery and mapping of new areas of 6410 as a consequence of surveys such as the National Fen Survey (Brophy *et al*., in prep.) – that survey alone contributed an additional 1.75 km^2 of previously unmapped 6410 habitat. The proportion of the habitat in good condition within the network was compared across this monitoring period and the last, and the results were similar, with 60.5% of the area of monitored 6410 within the SACs in good condition in the current reporting period, compared to 63.1% in good condition in the last reporting period. This does not take into account improvements observed in one site three years after the monitoring visit. Ballyteige SAC was walked in summer 2024 and found to have improved in condition (e.g., better distribution of indicator species and less dense litter layer) since it was surveyed in 2021, owing to active conservation measures in place to reinstate grazing. The short-term trend of the habitat area in good condition within the SAC network is therefore *stable*, with the same trend as the 6410 habitat nationally. While the trend of habitat in good condition has remained stable, some habitat loss has occurred within the SAC network, although this is primarily due to transition to other habitats of equally high conservation value. Martin *et al*. (in prep.) reported that a net total of 18.4 ha of 6410 habitat have been lost from SACs since the previous reporting period. The largest loss was seen from the River Shannon Callows SAC, which lists 6410 as a QI. Some of these losses are likely due to changes in hydrology (e.g., some areas staying flooded for longer) and resulting changes in management, (e.g., unable to mow due to flooding). Some of the reductions were caused by a transition to drier Annex I habitat 6510 or in other areas to the wetter Annex I habitat Hydrophilous tall-herb swamp 6430, both of which, in terms of conservation value, could be regarded as of equal quality and/or importance. The River Shannon Callows SAC lists 6410 and 6510 as qualifying interests, but neither of the other two SACs that registered changes in 6410 lists 6410 as a QI. The small area loss from Lough Ree SAC (0.04 ha) was due to undergrazing and scrub encroachment. Both losses and gains were noted in the Lough Carra/Mask Complex SAC, with an overall net gain. This is mainly due to an increase of 0.65 ha of 6410 habitat due to nature-focused, sensitive management.

12 Complementary information *N/A*

Molinia meadows (6410)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels**
1.2i Habitat short name	**Hydrophilous tall-herb swamp**
1.3i Habitat description	In Ireland, Hydrophilous tall-herb fringe communities were previously considered to occur in three situations, all characterised by a high proportion of tall herb species being present in prevalent hydrophilous or nitrophilous conditions. The three situations were upland, typically on base-rich ledges; lowland along the unmanaged margins of slow-moving rivers, lakes and other wetlands; and a nitrophilous 'saum' community that grows along woodland margins. However, a recent survey of 6430 did not find any evidence that saum communities corresponding to the 6430 habitat occur in Ireland. In upland situations, 6430 is a community of flushed ground with at least mildly base-rich water and a prominent component of tall herb species, such as *Angelica sylvestris*, typically restricted to fragmented, relict stands on inaccessible ledges away from grazing pressure. In the lowlands, the typical occurrence is as stands dominated by tall herbs, with a diversity of species present, fringing rivers and lakes, usually as a narrow strip and often seasonally inundated. A single species, such as *Filipendula ulmaria,* can form a significant proportion of the cover, but there should be a diversity of tall herb species present, not a monodominant sward of one species with scattered herbs. Reeds and tall grasses and sedges do not form a significant component of the vegetation. Structurally, this habitat occurs as a distinct stand of tall herb-dominated vegetation, typically forming a fringe along a river, lake or swamp edge. Reed swamps and wet grasslands containing scattered plants of tall herb species that do not form significant stands are not included. Tall herb species common to both variants include *Angelica sylvestris*, *Crepis paludosa*, *Filipendula ulmaria* and *Valeriana officinalis*. Other tall herbs in the lowland variant include *Cicuta virosa, Lysimachia vulgaris*, *Lythrum salicaria*, *Sium latifolium*, *Thalictrum flavum*, and these are accompanied by smaller herbs such as *Caltha palustris*, *Calystegia sepium, Solanum dulcamara* and *Vicia cracca*. The upland variant contains such species as *Alchemilla* spp., *Cochlearia officinalis* agg., *Hieracium* agg., *Saussurea alpina* and *Thalictrum minus*.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1980-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map for 6430 was derived from a polygon shapefile, a polyline shapefile and a point shapefile. These shapefiles were created by compiling relevant data that referred to habitat 6430 in their attributes. All data sources used are listed in section 3.4, and further information on the mapping, as well as some limitations, are given in section 5.17. Three working files containing all polygons, polylines and points considered for 6430 were collated from the sources listed in section 3.4. A certainty rating was assigned to mapped polygons and points, with a range of 3 to 1 from high to low certainty (corresponding to definitely/probably/possibly 6430). Recent data sources (10 years old or less) listed in section 3.4 recorded by experienced ecologists, and where the habitat was visited, were assigned a high certainty=3. These are accepted as being the 6430 habitat. No dataset over 10 years old was assigned a certainty=3, as there is a possibility that the habitat recorded over 10 years ago may not still be present. Data sources where the habitat was confirmed but 10-20 years have elapsed since the surveys, or more recent surveys where the habitat was viewed from a distance rather than walked, were assigned a lower certainty=2. Older data sources (more than 20 years old) that possibly include the 6430 habitat were assigned a low certainty=1. All data sources with a certainty of 1 to 3 were used to map the distribution of the 6430 habitat and, from this, to derive the habitat's range. Six datasets with data from the current reporting period - Hodd *et al*. (in prep.), Brophy *et al*. (in prep.), O'Neill *et al*. (2023), Hodd (2023), Martin *et al.* (2023) and Scott Cawley (2021) – were assigned a certainty of 3. Records from Wetland Surveys Ireland (2022-2023) were assigned a certainty of 3 if the DATA_QUAL value was 'S', indicating that the habitat had been walked, or a certainty of 2 if the DATA_QUAL value was 'V', indicating that the habitat had been viewed but not walked. Certainty values of data utilised during the last reporting period were changed from 3 to 2 if the dataset was now over 10 years old.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Seven sources provided 6430 data from the current reporting period: Hodd *et al*. (in prep.), Brophy *et al*. (in prep.), Martin *et al.* (2023), O'Neill *et al*. (2023), Hodd (2023), Wetland Surveys Ireland (2022-2023) and Scott Cawley (2021) (see below for full references). In addition to these datasets, a comprehensive search was carried out for other existing data on 6430 in Ireland. The primary source for upland occurrences of the habitat was the National Survey of Upland Habitats (Perrin *et al*., various years, see below; Roche *et al*., 2014) and for lowland records was the Irish Semi-natural Grasslands Survey (O'Neill *et al*., 2013a). Data collated for the 2019 Article 17 assessment of 6430 (NPWS, 2019) also provided much data and acted as a foundation on which to build and add relevant data. Other known surveys were gathered and reviewed, and a range of ecologists were consulted in order to ensure that no potential sources of data were missed. Relevés potentially corresponding to the habitat were extracted from the National Vegetation Database (NVD). Relevés selected were those classified within Irish Vegetation Classification (IVC; Perrin, 2024) communities that are considered to have affinities to 6430, i.e. GL1B, GL2A, FW3F, FW3N and RH2D. In addition, rare species data, consisting of records and reports, were obtained from NPWS for *Saussurea alpina*, *Trollius europaeus* and *Sium latifolium*, all species that are considered indicators of the habitat. **Polygons were included from the following datasets:** Brophy, J.T. & D'Arcy, D. (2016) Baseline Ecological Survey of the Old Roosky Canal, Towpath and Adjacent Lands. Unpublished report by BEC Consultants Ltd. Brophy, J.T. & Martin, J.R. (2015) Drumshanbo to Battlebridge Blueway. Unpublished report by BEC Consultants Ltd. Brophy, J.T. *et al.* (in prep.) National Fen Survey 2021-2025. Report for National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Carlow Pilot Habitat Mapping Project. GIS files for this Carlow County Council habitat survey were available and utilised for the previous reporting period, with data carried through to inform the current reporting period. Clare survey of vulnerable landscapes. GIS files for this Clare County Council habitat survey were available and utilised for the previous reporting period, with data carried through to inform the current reporting period.

	Coillte Biodiversity Dataset. GIS files and individual site management plans were made available by Coillte and utilised for the previous reporting period, with data carried through to inform the current reporting period. Datasets used were from 2000 to 2007. Crushell, P., Foss, P.J. & Kirwan, B. (2015) Kerry Wetland Survey II. Report prepared for Kerry County Council. Denyer, J. (2020) Dun Laoghaire-Rathdown County Habitat Review project. Report for Dun Laoghaire-Rathdown County Council. Fingal habitat survey. GIS files for this project were made available by Fingal County Council and were utilised for the previous reporting period, with data carried through to inform the current reporting period. Foss, P.J., Crushell, P. & Kirwan, B. (2015a) County Waterford Wetland Survey. Part 1: Main Report. Report prepared for Waterford City & County Council. Foss, P.J., Crushell, P. & Kirwan, B. (2015b) County Waterford Wetland Survey. Part 2: Site Reports. Report prepared for Waterford City & County Council. Foss, P.J., Crushell, P., O'Loughlin, B. & Wilson, F. (2012) Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Hickey, B. & Tubridy, M. (2009) Habitats Survey (Phase V) County Laois. Unpublished report by Mary Tubridy and Associates for Laois Heritage Forum. Hodd, R.L. (2023) Survey of an area of 6430 at Rathcoole Woods, Co. Dublin. Report for Four Districts Woodlands Group. Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) Review of four upland/uncommon grassland habitats (6230, 6430, 6150, 6170). *Irish Wildlife Manuals* No. 1XX, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Kearney, P. (2010) Habitat mapping of habitats in County Cavan, survey findings report. Unpublished report by RPS Group for Cavan County Council. Lough Derg Habitat Survey. GIS files for this project were made available by Clare County Council and were utilised for the previous reporting period, with data carried through to inform the current reporting period. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2023) Floodplain and Callows Grasslands in Ireland. *Irish Wildlife Manuals*, No. 144. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***40,400 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.25%***
	b) Estimated Maximum	***0.25%***
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 40,500 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 6430 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the tool. The range extent of 404 10x10 km grid cells reported in section 4.1 is significantly higher (112%) than that reported in 2019, but this is due to improved knowledge. Most of the additions to range are due to point data. In 2021, NPWS commissioned a project 'Review of upland/uncommon grassland habitats', which included surveys of 6430 (Hodd *et al*., in prep.), and this added 135 points from field surveys. Hodd *et al.* (in prep.) carried out a comprehensive review of existing mapped areas of four less common grassland habitats in Ireland, including 6430. They selected sites for survey on the basis of this review, from across the geographical range of the habitat, both within and outside of SACs. Where 6430 was listed as a Qualifying Interest for an SAC, sites were selected for survey within the SAC where the habitat was thought to be most likely to occur. Some sites that had previously been surveyed by the National Survey of Upland Habitats (Perrin *et al*., 2014c) and Irish Semi-natural Grasslands Survey (O'Neill *et al.,* 2013) were selected where specific questions about extent or condition needed to be answered, but the majority of sites had not previously been surveyed in detail. However, the survey under which this work was carried out included within its remit three other uncommon Annex I grassland habitats, and thus, while the survey was more focused on 6430 than previous grassland surveys, it was still not dedicated solely to it, so not all sites containing the habitat will have been visited. Nonetheless, the dataset used to determine the range of 6430 is more comprehensive than any used previously. Short-term trend of Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Comparing the range reported in NPWS (2019) with that in the current reporting period, there is no evidence of loss of range between 2019 and 2024, but the decrease in range between 2013 and 2018 by one 10x10 km grid cell in Cork noted in NPWS (2019) still stands. The short-term trend of Range is therefore *decreasing*, with the magnitude of the known loss 0.25% over the 12 years since 2013, which is an average loss from the range of 0.02% per annum. As part of the data collation work for this National Conservation Status Assessment (NCA), a number of other sources (detailed in section 3.4 above) were consulted. One of these was the Map of Irish Wetlands compiled by Wetland Surveys Ireland. The Annex I habitat was often not specified for habitat listed as the FS2 Tall-herb swamp habitat of the Heritage Council Habitat classification system (Fossitt, 2000), and it was considered that these could not definitively be linked to the 6430 habitat. Hence, these points were not included. Favourable Reference Range (FRR) was taken to be the current range plus the 10c10 km grid cell lost between 2013 and 2018. The FRR therefore covers 405 10x10 km grid cells.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2000-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.086 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing / **decreasing** / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*

	d) Unknown	
5.9 Short-term trend **Magnitude** **Type of estimate**	*Best estimate / multi-year mean / 95% confidence interval / minimum/**pre-defined range***	
5.10 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*	***2000-2024***	
5.12 Long-term trend **Direction** *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ ***between 11% and 25% smaller than the FRA*** ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/moderate/**low***

	☐ ***Expert opinion***
	☐ *Other (Elaborate in Additional information 5.17)*
5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The dataset used to determine the surface area of the 6430 habitat comprises data from between 2000 and 2023, the sources of which are listed in section 3.4. Some points recorded pre-2000 that were used to help define the range of the habitat were excluded as they did not have an area assigned to them, e.g., relevés for which no associated area was mapped. Area was calculated from the polygon, polyline and point shapefiles used for distribution. For each point not intersecting a polygon that was yielding an area, habitat was estimated on a case-by-case basis. For the polyline shapefile, the total length of 6430 habitat was calculated and assigned a width of 1 m to provide an area. During the current reporting period, Hodd *et al*. (in prep) surveyed 18 sites with 6430. In the absence of any evidence to the contrary, and lacking data from previous surveys, the majority of sites were considered not to have lost area of the target habitat within the recent past. However, at two sites, evidence of likely loss of habitat was observed, through encroachment of non-native species (*Impatiens glandulifera*) and the construction of vehicle tracks. Small-scale losses due to recreational activities (fishing and barbecues) have been observed at one site (NPWS Ecologist, pers. comm.). It is evident, therefore, that some losses are not being captured due to limited surveys for this habitat, both in the past and in the most recent reporting period, and it is likely that other undocumented anthropogenic losses in area have occurred at other sites. The percentage loss given in section 5.8 is therefore a minimum. At a number of upland sites surveyed by Hodd *et al*. (in prep.), the potential area of 6430 was restricted due to grazing, and while grazing pressures are generally lower now than in recent decades, they are generally not low enough to allow recovery of many upland habitats. However, as this impact has been ongoing since before the Directive came into force, no loss of area was deemed to have occurred at these sites. For the 2013-2018 NCA report (NPWS, 2019), all 6430 habitat polygons recorded in the 2007-2012 period from the Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.* 2013a) were examined using aerial photography for losses in area. The findings from this are still relevant as the changes are thought most likely to have occurred during the short-term trend interval for the current reporting period (2013-2024). Short-term trend in Area is assessed as *decreasing,* with a magnitude in the range of 0-12%. The magnitude of the known losses between 2013 and 2018 was calculated as 0.002 km^2, and losses recorded in the current reporting period were too small to significantly change this figure. Therefore, the percentage change overall between 2013 and

	2024 is 0.1%, which is equivalent to an average loss of 0.008% per annum, measured over a period of 12 years over the last two reporting periods. As noted above, this figure represents a minimum rate of decrease, and due to the small sample and the resultant fact that the loss could in fact be greater, the pre-defined range option was chosen. If more detailed survey work in the 6430 habitat takes place in the future (e.g. comprehensive surveys of all SACs in which the habitat is known to occur), it is expected that the area given in section 5.2 will be refined and likely will increase as more in-depth mapping of the 6430 habitat is completed, and as areas of currently unmapped 6430 habitat within the country are discovered. The National Survey of Upland Habitats is still ongoing, and more examples of the upland community are likely to be found. The ISGS (O'Neill *et al*., 2013a) only recorded the lowland riparian community where it occurred within or adjacent to semi-natural grassland, so there are likely to be many more examples along lowland rivers that have not been mapped. The area value entered in section 5.2 is therefore a minimum. Favourable Reference Area (FRA) is deemed to be more than the current area, given that anthropogenic losses have occurred since the Directive came into force. It is likely that the actual annual percentage loss is higher than 0.008% due to the proximity of the 6430 lowland riparian community to lowland farmland, thereby being impacted by agricultural improvement and changes in drainage management along watercourses. Invasive alien species are also known to be having an impact, particularly *Impatiens glandulifera*. However, data are lacking, particularly on where this species causes area loss, and it is thus difficult to calculate the actual loss in area since the Directive came into force. Based on expert opinion, the current area is deemed to be 11-25% below the FRA. The higher threshold reported for this period, compared to NPWS (2019), is informed largely by the significantly higher range reported, with the previous difference of <10% between the FRA and the current area no longer deemed ecologically appropriate if the habitat is to reach favourable conservation status. The Explanatory Notes for Article 17 reporting state: "Favourable reference area is the surface area in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the habitat type; this should include necessary areas for restoration or development for those habitat types for which the present coverage is not sufficient to ensure long-term viability." It is considered that an increase of 11-25% in habitat area is required in order for the habitat to be viable in the long term. The difference in habitat extent between this reporting period and the last is mainly due to the availability of more accurate data on the area of the 6430 habitat. This has resulted in the addition of 1.086 km^2 which was previously unmapped.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.101 km²***
		Maximum	***0.101 km²***
	b) Area in not-good condition	**Minimum**	***0.019 km²***
		Maximum	***0.019 km²***
	c) Area where condition is not known	**Minimum**	***1.970 km²***
		Maximum	***1.970 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		
6.7 Typical species Method used *Optional*	Assessment criteria were previously devised for the lowland, hydrophilous variant of this habitat as part of the Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.*, 2013a), and these were amended by Perrin *et al*. (2014c) to accommodate the upland variant. No criteria have been devised for the woodland edge variants, as no stands of this variant corresponding to the Annex I habitat have been identified to date in Ireland (Hodd *et al*., in prep.). Therefore Hodd *et al.* (in prep.) modified the assessment to be applicable to both the upland and lowland hydrophilous variants. The indicator list already in existence was modified and revised, with separate lists of tall herb indicator species and general accompanying indicator species, and a requirement added for at least two tall herb species and two general indicator species to be present to pass the assessment. A number of other criteria were modified from the previous scheme, primary among these being an increase in the required cover of tall herb species from 40% to 60%. It was considered that stands of this habitat		

	should be dominated by tall herb species, and that stands with less than 60% cover of tall herb species do not represent high-quality examples of this vegetation. The scale of the assessment of the cover of scrub, bracken and heath was changed from 'within the relevé only' to 'within the local vicinity'. The indicator list for the upland variant was created based on species listed by Perrin *et al*. (2014c) as characteristic of upland tall herb communities on ledges, species considered to be characteristic of this habitat in the UK, and expert judgement. In general, the upland variant has less diversity of tall herb species than the lowland variant, so two indicator species are required for the upland variant to pass on the indicator richness criterion. The required total cover of tall herb species for the upland variant is lower than that for the lowland variant, as it is often a grassier type of vegetation, with less dominance of tall herbs. The mean height requirement was also set lower for the upland variant than for the lowland variant, at 20 cm, as vegetation will generally not grow as tall in the uplands as in the lowlands, due to prevailing environmental conditions. A criterion that less than 25% of live leaves of forbs should show signs of grazing was set for the upland variant but is not applicable to the lowland variant. **Lowland tall herb indicators:** *Angelica sylvestris, Cicuta virosa, Crepis paludosa, Epilobium hirsutum, Eupatorium cannabinum, Filipendula ulmaria, Iris pseudacorus, Lysimachia vulgaris, Lythrum salicaria, Oenanthe crocata, Petasites hybridus, Rumex hydrolapathum, Scrophularia auriculata, Sium latifolium, Symphytum officinale, Thalictrum flavum, Trollius europaeus, Valeriana officinalis*. **Lowland general indicators:** *Alisma lanceolatum, Alisma plantago-aquatica, Caltha palustris, Calystegia sepium, Epilobium palustre, Epilobium parviflorum, Equisetum fluviatile, Equisetum palustre , Galium palustre, Hypericum tetrapterum, Lathyrus pratensis, Mentha aquatica, Myosotis spp., Persicaria amphibia, Solanum dulcamara, Stachys palustris, Vicia cracca, Vicia sepium.* **Upland positive indicators:** *Alchemilla spp., Angelica sylvestris, Cochlearia officinalis agg., Crepis paludosa, Filipendula ulmaria, Geum rivale, Heracleum sphondylium, Hieracium agg., Hypericum pulchrum, Meconopsis cambrica, Oxyria digyna, Primula vulgaris, Ranunculus acris, Rumex acetosa, Saussurea alpina, Sedum rosea, Solidago virgaurea, Succisa pratensis, Thalictrum minus, Valeriana officinalis.*
6.8 Additional information *Optional*	Of the 51 monitoring stops carried out in 6430 in the current monitoring period by Hodd *et al*. (in prep.), 16 failed prior to the application of expert judgement. After review using expert judgement, the number of failures was reduced to seven. This high number of overturned failures suggests that, due to the wide variation within this vegetation, it is difficult to assess all stands using the same set of criteria. In the case of upland 6430 at two sites in Co. Wicklow and lowland stands at Saint Mullins, Co. Carlow and Drumlosh, Co. Roscommon, the failures were not due to any deficiencies in structure

	or resulting from any impacts, so the failures were overturned. The upland stands in Co. Wicklow are naturally poorer in indicator species than stands in the west of the country and the herbs present do not appear to grow as tall. However, otherwise they are structurally and floristically analogous to stands elsewhere in the country. The lowland stands at Saint Mullins and Drumlosh represent the variation of this vegetation from wetter ground, with standing water present for much of the time, with the stand sampled at Saint Mullins being tidally inundated daily. Vegetation of this type seems to be less common, so further sampling may be required to tailor the assessment criteria to these variants. The other stops passed on expert judgment were recorded early in the season, when the vegetation was not fully developed, and it was considered that they would pass on all criteria later in the season. Of those that failed, low cover of tall herbs was the most frequent reason for failure, along with high cover of negative indicators, scrub encroachment and encroachment of the invasive non-native species *Impatiens glandulifera*. The area assessed for Structure and functions in the last two reporting periods together represents just 5.74% of the known national area of the habitat. Given the extent of the problem of the invasive *Impatiens glandulifera* along riparian systems in Ireland where 6430 frequently occurs, among other issues, it is considered highly probable that the area in good condition is lower than the results from the above sample suggests. Given these concerns (i.e. known issues which may be under-recorded, and small proportion of habitat area assessed), it is considered that the data are not strong enough to extrapolate up to the national resource. Thus area in good and not-good condition are provided based on available data, and the condition of the remainder of the known habitat area is given as unknown. While the area included in the detailed surveys is below 25% of the total area, the overall condition of the habitat has been determined by combining the outcomes of the detailed surveys with a wider range of source material. The widespread distribution of the invasive *Impatiens glandulifera* and its ecological requirements are such that we can state with a degree of confidence that it is likely to have an ongoing impact on the condition of 6430 in many of its lowland sites, and therefore the condition is assessed as *Unfavourable-Bad*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	High
PA06 Mowing or cutting of grasslands	Ongoing and likely to be in the future	Minority <50%	Medium
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium

PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PL04 Development and operation of dams (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	R07248 *Heracleum mantegazzianum* R07719 *Impatiens glandulifera*
f) Other invasive alien species *Optional*	R18662 *Senecio sarracenicus* R14777 *Symphyotrichum* x *salignum*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Hodd *et al*. (in prep.) provided the main evidence of current pressures operating on the 6430 habitat. Additional information on pressures was provided by NPWS (Maria Long, pers. comm.). All pressures presented in NPWS (2019) were also considered for the current reporting period. Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) Review of four upland/uncommon grassland habitats (6230, 6430, 6150, 6170). *Irish Wildlife Manuals* No. 1XX, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Edited by Deirdre Lynn and Fionnuala O'Neill.

7.4 Additional information *Optional*	Four medium-importance pressures were recorded in the last reporting period: PA07 'Intensive grazing or overgrazing by livestock' (under the old code A09); PA22 'Drainage for use as agricultural land' (under A31); PI01 'Invasive alien species of Union concern' (under I01); and PI02 'Other invasive alien species (other than species of Union concern)' (under I02). PA07 was recorded in the current reporting period by Hodd *et al*. (in prep.) at three sites. Overgrazing was regarded as a greater issue at upland 6430 sites compared to lowland sites. As noted in section 5.17, Hodd *et al*. (in prep.) noted that the potential for 6430 habitat to expand was restricted at a number of upland sites due to grazing, which is still considered to be too high to allow recovery of many upland habitats. While the impact has been ongoing for many years, and no specific area losses of 6430 have been ascribed to overgrazing in the current reporting period, it nevertheless restricts the potential of the habitat to expand its area and range in these upland areas. Thus, while its current influence as a pressure is low, as specified in 7.1d, it should be regarded as having a medium-influence threat level. PA22 was not recorded at sites surveyed by Hodd *et al.* (in prep.). However, there is evidence from beyond the survey areas that this does impact on the habitat; this pressure led to the loss of area reported in the last reporting period, resulting in it being listed as a medium-importance pressure. This level has been retained for the current monitoring period. PI01 and PI02 are still issues that negatively impact on 6430 habitat. Invasive species were of concern at three sites surveyed by Hodd *et al.* (in prep.), with the well-established and highly invasive *Heracleum mantegazzianum* and *Impatiens glandulifera* negatively impacting 6430 habitat at one site each. They are frequently found along watercourses and produce copious amounts of seed which are dispersed easily by water (Stroh *et al.*, 2023). Both are on the list of invasive alien species of Union concern. *Impatiens glandulifera* in particular is problematic for the habitat as it has a high affinity for the riparian situations in which 6430 develops. Hodd *et al.* (in prep.) noted that dense stands of the plant had replaced 6430 at one site within their survey sample, and similarly, Maria Long (pers. comm.) noted that *Impatiens glandulifera* was severely impacting on 6430 in riverside situations where the plant was forming dense swathes. For this reason, the influence level of PI01 has been upgraded from medium, in the last reporting period, to high in the current reporting period. Hodd *et al.* (in prep.) noted the presence of two other non-native species, *Senecio sarracenicus* and *Symphyotrichum* × *salignum*, also forming dense stands adjacent to 6430 habitat, although the level of impact posed was unclear. For this reason, impact PI02 has been given a low-influence impact level. Of the other impacts recorded by Hodd *et al.* (in prep.), the most frequently recorded were PA06 'Mowing and cutting of grasslands' and PF05 'Sports, tourism and leisure activities', both of which were frequent at sites located on riverbanks and beside canals, where there are often paths for walking or access for fishing. Mowing is also an

	impact at sites located in the Shannon Callows and other areas that flood, where mowing is undertaken annually for agricultural purposes. Because these were recorded with relatively high frequency (each was recorded at five sites), they have been assigned a medium-influence impact level. Along with PA07 'Intensive grazing or overgrazing by livestock', PA13 'Application of natural or synthetic fertilisers on agricultural land' is also known to put pressure on this habitat via possible point or diffuse source pollution. There may be direct run-off of slurry or artificial fertiliser, and direct bovine access to watercourses may also cause issues. Climate change and nitrogen deposition from the atmosphere have not been added as impacts, but they may both affect the range and species composition of the habitat (EPA, 2017).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MI01 Early detection and rapid eradication of invasive alien species of Union concern
8.7 Additional information *Optional*	The measure MA10 'Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities' includes developing and maintaining riparian buffer strips along water courses to reduce pollution to surface waters. This measure may be carried out along watercourses by landowners who participate in agri-environment schemes such as ACRES. The primary aim of the measure is to protect water quality. It is also listed as a measure under Ireland's Nitrates Regulations. Article 17.18 of the Regulations (Exclusion of bovines from watercourses) states: "Where bovine livestock have direct access to water from the holding, a fence shall be placed at least 1.5m from the top of the riverbank or water's edge (as the case may be) by 1 January 2021." While this measure is aimed more at protecting water quality than protecting 6430 habitat, its implementation should nevertheless benefit the habitat by reducing trampling and nutrient inputs. A number of community initiatives, facilitated by the National Biodiversity Data Centre, have been undertaken around the country to remove *Impatiens glandulifera* from watercourses. Control of *Heracleum mantegazzianum* also takes place, but because of the health and safety concerns around contact with this plant, control is usually undertaken by trained and properly equipped professionals. As with reducing pollution, implementing the measure may have a different primary aim, but the beneficial effect on the habitat is effective, regardless of its intention. Tackling the problem of invasive species in watercourses at a catchment level gives the best chance of success in achieving sustained control. A number of other measures, not currently being implemented, are recommended to improve the condition of the habitat nationally. The most frequent conservation measure identified by Hodd *et al*. (in prep.) as being required across the 6430 habitat was modification of agricultural practices (MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)'), or even, in specific instances, a complete suspension of management (MA06 'Stop

	mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)', noting that, at two upland 6430 sites, a complete cessation of grazing would be highly beneficial on slopes directly below the cliffs on which the habitat occurs, as there were signs that with reduced grazing pressure, the habitat would also naturally occur on those slopes. The measure MF03 'Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)' is also required to counteract the impacts of outdoor activities, mainly walking and fishing, identified under pressure PF05, to reduce their impact, would lead to the improvement of the condition of the vegetation at a number of lowland sites. Hydrophilous tall herb communities can be considered to be water-dependent systems. In the uplands, patches of 6430 often follow the line of flushing below cliffs and on steep slopes, occurring on rockfaces and ledges through which mineral-rich water percolates. In the lowlands, 6430 habitat has been observed always to occur in close proximity to water, either directly adjacent to rivers, lakes and canals, or where inundation occurs for at least part of the year or tidally. As such, it is important that any conservation measures take this requirement into account.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / Poor / **Bad** / Unknown*
	c) Structure and functions	*Good / Poor / **Bad** / Unknown*
9.2 Additional information *Optional*	Current Range is less than 10% below the Favourable Reference Range. An average loss of 0.02% per annum was recorded for the range over the last two reporting periods. Conservation status of Range is therefore *Unfavourable-Inadequate*. Short-term trend direction of Range is assessed as *decreasing*. Future trend of Range is assessed as *negative*, as the threats reported in section 7 above are expected to have a negative influence on Range. Future prospects of Range are therefore *Poor*. Current Area is 11-25% below the Favourable Reference Area. An average loss of 0.008% per annum was recorded for area over the last two reporting periods. Conservation status of Area is therefore *Unfavourable-Bad*. Short-term trend direction of Area is assessed as *decreasing*. Future trend of Area is assessed as *negative*, as the threats reported in section 7 are expected to continue to have a negative influence on Area. Future prospects of Area are therefore *Bad*. Current Structure and functions are assessed as *Unfavourable-Bad* based on expert judgement (as only 5.74% of the national resource was assessed). Short-term trend direction is *decreasing* (for habitat that is in good condition). Future trend of Structure and functions is assessed as *negative*, as the threats reported in section 7 are expected	

	to continue to have a negative influence on Structure and functions. Future prospects of Structure and functions are therefore *Bad*. Sections 8.6 and 8.7 list conservation measures that are recommended or are actively being implemented across the 6430 resource in the country. If the recommendations were to be fully implemented, the future trend of Area and Structure and functions could be assessed as *stable*. However, it is impossible to be certain that sufficient recommended measures will in fact be carried out over the next monitoring period. Therefore, the future trend of Area for this monitoring period is assessed as *negative*, as in the previous reporting period. The short-term trend direction and the future trend for Structure and functions have been assessed as *decreasing* and *negative* respectively, which is lower than the previous report, in which these were assessed as *stable*. This is due to greater importance being attributed to invasive species as a pressure affecting structure and functions. It should be noted that programmes such as ACRES and NPWS Farm Plans are counterbalancing negative trends in some areas, particularly where no conservation management had previously been implemented, and the Nature Restoration Law is expected to prove beneficial to the habitat as a whole.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / **deteriorating** / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*

	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Unfavourable-Inadequate* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Unfavourable-Bad*, a deterioration from *Unfavourable-Inadequate* in the last reporting period. This is due to the decision to increase the Favourable Reference Area of the habitat to 11-25% higher than the current area, based on the significantly higher range reported in the current reporting period. This estimate is considered to provide sufficient area for the long-term viability of the habitat. The Conservation Status of Structure and functions is *Unfavourable-Bad* in this reporting period, which is unchanged from the previous reporting period. Future prospects are *Unfavourable-Bad* in this reporting period because of the *Unfavourable-Bad* status of Area and Structure and functions, and because there are not yet sufficient conservation measures in place to halt or reverse the decreasing trends in all three parameters. The Overall Conservation Status is assessed as *Unfavourable-Bad*, unchanged from the last reporting period. Trend in Overall Conservation Status is assessed as *deteriorating* in this reporting period, as it was in the last reporting period. A larger area of the habitat was mapped in this reporting period, but this was due to improved knowledge rather than actual gains in the extent of the habitat, and losses of area continue to occur.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.160 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing / **decreasing** / uncertain/ unknown*
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution shapefiles and the SAC shapefile. Point, polyline and polygon files were all used. The assigned areas of the points that fell within an SAC boundary were added up to calculate the area contributed by the points. For the polygons, a straightforward union was carried out between the polygon distribution file and the SAC shapefile. The area of each polygon in the union ('Union_area') was calculated in GIS and the percentage of 6430 habitat in each polygon was then multiplied by the Union_area to obtain the area of 6430 habitat in the polygon. A series of sorts was then carried out in Excel to calculate the area of 6430 habitat within the network, and within the SACs for which 6430 is a QI. The area given in section 11.1 is the total area of 6430 habitat in SACs in the country, including some SACs where 6430 is not listed as a qualifying interest (QI). The area of 6430 within the Natura 2000 network where it is listed as a QI is 0.106 km^2, a very slight increase from the last reporting period, which is due to the inclusion of new points in the dataset. This is a very small area, comprising 5% of the known national resource of the habitat. The anthropogenic losses of 6430 habitat that were reported in the previous reporting period, and which informed the short-term trend of habitat area (0.002 km^2), occurred outside of the SAC network. However, small area losses occurred during the current reporting period at two sites (Saint Mullins and Drumlosh) that both occur

	within SACs, including one that lists 6430 as a QI (002162 River Barrow and River Nore SAC). The trend in area within the SAC network is therefore *decreasing*, although at a rate less than that outside of the network, based on the limited data available. The short-term trend of the 6430 habitat in good condition within the SAC network is taken to be *decreasing*, with the same trend as the 6430 habitat nationally (section 6.4). The reported surface area of 6430 habitat within the Natura 2000 network has exactly doubled since last reporting period, from 0.58 km^2 to 1.16 km^2. This is due to the availability of more accurate data of the area of habitat 6430 from survey work carried out during the current reporting period, rather than any increases in habitat extent.

12 Complementary information *N/A*

Hydrophilous tall-herb swamp (6430)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)**
1.2i Habitat short name	**Hay meadows**
1.3i Habitat description	The Annex I habitat 6510 Lowland hay meadows is represented in Ireland by mesotrophic semi-natural grasslands that are almost always managed as traditional hay meadows (typically cut once a year in late summer or autumn with the hay crop removed). These meadows are synonymous with the fertile plains of the larger river systems such as the Shannon and Moy. However, they have been found on flatter ground amongst low hills, drumlins, and there are also some sites on the coast. Increasingly the habitat is also being found in demesnes and parks which are managed for nature. The habitat is only rarely found in submontane (200-400 m) areas. The areas of 6510 mapped in the Shannon Callows account for approximately 40% of the known area within the State. The 6510 habitat is comprised of a few distinct meadow communities belonging to the Arrhenatherion. The community with the best correspondence is GL3E *Festuca rubra – Rhinanthus minor* grassland, but the habitat also has an affinity with the GL3C *Festuca rubra – Plantago lanceolata* grassland community (Perrin, 2021). In other classification systems, 6510 falls into the *Lathyrus pratensis* community of Heery (1991) and the MG4/MG5 mesotrophic grassland communities of Rodwell (1992).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1987-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map for 6510 was developed using the Article 17 distribution map for 2013-2018 as a starting point, so all data sources listed in section 2.5i of the 2013-2018 Article 17 report for 6510 (NPWS, 2019) were initially included. This map was amended in 2024 to incorporate updates from surveys carried out in the current

	monitoring period. This primarily affected the polygons from the 2015-17 Grassland Monitoring Survey (GMS15-17; Martin *et al.*, 2018) and 2007-12 Irish Semi-natural Grasslands Survey (ISGS; O'Neill *et al.*, 2013), because a subset of these were revisited as part of the Grassland Monitoring Survey of 2021-23 (GMS21-23) (Martin *et al.*, in prep.). A significant amount of previously undocumented 6510 habitat, or data not previously included in the Article 17 maps, was brought into the 2024 dataset. An additional 74 ha of 6510 habitat was brought in from a desktop review of maps of the River Shannon callows (floodplain) drawn in the 1990s (Heery, 1993). Another historical source, also from the River Shannon callows, brought in 27 ha more (Nairn, 1988). Further new data came from the Callows survey (Martin *et al.*, 2022; 7 ha), National Fen Survey (2021-2023 data) (Brophy *et al.*, in prep.; 5 ha), and from a number of other sources such as the NPWS Farm Plan Grassland Monitoring project (Owens & Delaney, 2021) (6.4 ha). A full list of all sources is given in section 3.4. A comprehensive review using recent aerial imagery was conducted for each polygon in the dataset to ensure that the habitat was still grassland and, where possible to ascertain, still managed as meadow. A certainty rating was assigned to mapped polygons and points, with a range of 3 to 1 from high to low certainty (corresponding to definitely/ probably/possibly 6510). Recent data sources (10 years old or less) listed in section 3.4 recorded by experienced ecologists, and where the habitat was visited, were assigned a high certainty=3. These are accepted as being the 6510 habitat. No dataset over 10 years old was assigned a certainty=3, as there is a possibility that the grassland habitat recorded over 10 years ago may not still be present. Data sources where the habitat was confirmed but 10-20 years have elapsed since the surveys, or more recent surveys where the habitat was viewed from a distance rather than walked, were assigned a lower certainty=2. Older data sources (more than 20 years old) that possibly include the 6510 habitat were assigned a low certainty=1. Further scrutiny was applied at a more detailed level to determine if particular records within the datasets represented the habitat, using field surveyor notes such as species recorded, or whether the area was walked, viewed or reviewed by remote imagery. A certainty value of 0 was assigned to records that were deemed not to represent 6510. All polygons with certainty 1 to 3 were used to map the distribution of the 6510 habitat. As detailed in NPWS (2013b, 2019), 66 of the 2,067 grassland relevés collected by Austin O'Sullivan between 1962 and 1972 were deemed to represent the 6510 habitat. As the O'Sullivan data are over 50 years old, they were not utilised in calculating the current area or current range of the Annex I habitat, but they were utilised when calculating the Favourable Reference Range.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**Datasets incorporated since the 2013-2018 Article 17 report (NPWS, 2019):** Brophy, J. *et al*. (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Heery, S. (1993) National ASI (Areas of Scientific Interest) Survey: Ecologists site card. River Shannon Callows Athlone to Portumna. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Heery, S. & Keane, S. (1999). Shannon Callows Management Plan. MPSU. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Hodd, R. (2021) A survey to assess the woodlands and associated semi-natural habitats at Rathcoole, Co. Dublin. Unpublished report. JBA (2023) Survey of three parks in South Dublin County for quality of semi-natural grasslands and pollinators 2022. Report for South Dublin County Council. Martin, J., O Neill, F., Daly, O., Devaney, F. & Woods, K. (in prep.) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats 2021-2023. *Irish Wildlife Manuals*, No. 1xx. NPWS, Department of Housing, Local Government and Heritage, Ireland. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2022) Floodplain and Callows Grasslands in Ireland. *Irish Wildlife Manuals*, No. 144. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Nairn, R, Herbert, I.J. & Heery, S. (1988) Report on a Survey of the Breeding Birds and Plant Communities in the River Shannon Floodplain. Unpublished report to Irish Wildbird Conservancy, Dublin. NPWS Farm Plans 2019-2023 prepared by BEC Consultants. Owens, J. & Delaney, E. (2021) Assessment and Monitoring of Annex I Grasslands at NPWS Farm Plan Sites. Report prepared for National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Perrin, P.M. (2021) Irish Vegetation Classification: Community synopsis *Festuca rubra – Rhinanthus minor* grassland v2.0.

https://biodiversityireland.ie/projects/ivc-classification-explorer/ Accessed 27/11/2024.

Datasets checked for the 2019 Article 17 report (NPWS, 2019) are also relevant, and these are listed below:

Bourke, D., Hochstrasser, T., Nolan, S. & Schulte, R. (2007) Historical Grassland Turboveg Database Project: 2067 Relevés Recorded by Austin O'Sullivan 1962-1982. Database reference Nos: 25604-28543. Unpublished report for the National Parks and Wildlife Service, Dublin.

Galway County Council (2017) Unpublished data collected for the Galway City Transport Project.

Kearney, P. (2011) Habitat Mapping of Habitats in County Roscommon. Unpublished Report by the RPS Group for Roscommon County Council. Roscommon.

Martin, J.R. & Brophy, J.T. (2017) An ecological report on the habitats, mammals, and birds of Maddens Island, River Shannon, Co. Offaly. Unpublished Report by BEC Consultants Ltd.

Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin.

O'Neill, F.H. & Martin, J.R. (2015) Summary of findings from the Survey of Potential Turloughs 2015. Volume I: Main Report. Unpublished Report for National Parks and Wildlife Service, Dublin.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. *Irish Wildlife Manuals*, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

Additional data sources:

Cole, E. (2021) Unpublished data: relevés recorded in Doneraile Park.

Denyer, J. (2022) Unpublished data: relevés recorded in Marlay Park.

NPWS (2013a) Inishbofin and Inishshark SAC (000278) Site Synopsis. National Parks and Wildlife Service, Dublin.

NPWS (undated) Natura 2000 ecologist notes for SAC 000197 West of Ardara/Maas Road.

O'Neill, F. (2024) Pers. obs. of Birr Demesne meadows.

Wyse Jackson, M. (2009) SAC 002070 Tralee Bay & Magharees Peninsula, West to Cloghane.

Additional references used to inform the assessment:

EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford.

	Heery, S. (1991) The plant communities of the grazed and mown grasslands of River Shannon Callows. *Proceedings of the Royal Irish Academy,* 91B (1), 1-19. Dublin. Kavanagh, S., Phelan, N. & FitzPatrick, Ú. (2023) Protecting Farmland Pollinators final report December 2023, National Biodiversity Data Centre, Waterford. NBDC (2025) All Ireland Pollinator Plan (AIPP) 2021-2025. https://pollinators.ie/aipp-2021-2025/. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Rodwell, J.S. (ed.) (1992) *British plant communities Volume 3: Grasslands and montane communities.* Cambridge Community Press, Cambridge.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***10,600 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable / **increasing** / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude	**a) Estimated Minimum**	***9.3%***
	b) Estimated Maximum	***9.3%***

Optional	**c) Pre-defined range**	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	*stable /* ***increasing*** */ decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 21,500 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*

	☐ ***Expert opinion***
	☐ *Other (elaborate in Additional information 4.13)*
4.13 Range when Directive came into force *Optional*	
4.14 Additional information *Optional*	Current range was calculated using the range tool, based on the current known distribution of the 6510 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Range has increased from 81 to 106 grid cells since the last reporting period, a net increase of 25 grid cells. Further analysis was carried out to determine the nature of any losses and gains. Examining increases in 6510 since the last reporting period in isolation from losses, newly mapped areas of 6510 added 23 new 10x10 km grid cells to the distribution, which in turn added 35 new cells to the range. Genuine increases in 6510 habitat were found to have contributed 22 of the new grid cells in the current range, with the remainder of the additions due to better knowledge of the habitat's distribution, thereby representing a correction rather than a gain. The genuine increases have been achieved by more suitable management, such as less intensive mowing. At least some of this change in management can be attributed to landowners signing up to schemes such as the NPWS Farm Plan scheme or the All-Ireland Pollinator Plan (NBDC, 2025). In the case of State-managed properties, such as Castletown House, Newbridge House and Doneraile, or privately owned properties, such as Birr Castle, the All-Ireland Pollinator Plan has likely played a role in raising the profile of pollinator-friendly mowing practices and has been adopted by a number of larger landowners, including Local Authorities. Examining decreases separately, four areas of previously mapped 6510 were removed from the distribution in the current reporting period, and this resulted in the removal of ten 10x10 km grid cells from the range. Of the four areas lost, two were genuine losses of habitat caused by agricultural intensification (resulting in the loss of six grid cells from the range), whereas the other two areas were removed from the 6510 map due to re-interpretation of the habitat as non-6510 (resulting in four cells being removed from the range due to change in interpretation rather than ecological change). Thus, of the ten 10x10 km grid cells removed from the range in this reporting period, six represent genuine loss, while the other four represent a correction to the range. The change in reported range over the last two reporting periods is an increase of 39 10x10 km grid cells (from 67 to 106). This masks a genuine loss in range of 14 grid cells (eight cells lost in 2013-2018 and six cells lost in 2019-2024). This is offset by a genuine gain of 23 cells (one cell gained in 2013-2018 and 22 gained in 2019-2024), a net genuine increase of nine grid cells. This is an increase in range of 9.3%, or an equivalent increase of 0.77% per annum over 12 years.

	In spite of the increases recorded, it is important to note that the areas of 6510 at some of the new sites are not directly equivalent to, or a replacement for, the 6510 habitat in the wider countryside. The latter compasses more complex habitat mosaics and, often, have an additional cultural value through the traditional methods employed in their management (see also section 5.17). The Favourable Reference Range (FRR) was obtained by running the range tool on three shapefiles: the current distribution (polygons), the 10 km distribution cells lost due to genuine loss of habitat since 2013, and the historical points recorded in the 1960s and 1970s by the botanist Austin O'Sullivan. These relevés were digitised by Bourke *et al*. (2007). The dataset of O'Sullivan's relevés was examined as part of the Article 17 reporting in NPWS (2013), and 66 relevés were deemed to be ascribable to 6510. The 66 points used to inform the FRR have been geolocated as precisely as possible, but some inaccuracies may remain due to the difficulty of giving precise coordinates to relevés whose locations were described in relation to landmarks and roads (some of which are no longer extant), rather than pinpointed using modern GPS equipment. From an examination of O'Sullivan's data, the main changes to the range of 6510 have occurred in Monaghan/east Cavan/north-west Meath (21 relevés of 6510 across 11 10x10 km grid cells were recorded by O'Sullivan here, but there are currently no mapped areas of 6510 from these 11 cells), south-west Donegal (O'Sullivan recorded eight relevés of 6510 across five 10x10 km grid cells where there is currently no mapped 6510) and east Clare/north-west Tipperary/north-east Limerick (seven relevés of 6510 recorded across six 10x10 km grid cells that currently have no mapped 6510). O'Sullivan's historical relevé data add 95 10x10 km grid cells to the range. Adding in the range cells lost due to genuine habitat losses since 2013 brings the total FRR to 215 10x10 km grid cells. In other words, in order for the current range to reach the FRR, it will have to more than double, from 106 grid cells to 215.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1987-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.249 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	

5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / **increasing** / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***14%***
	b) Estimated Maximum	***14%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate** / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

5.12 Long-term trend Direction *Optional*	*stable / **increasing** / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ ***between 26% and 50% smaller than the FRA*** ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	Unknown	
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins with data mapped in 1987 and incorporates updates made during the last reporting period (NPWS, 2019) and surveys that have taken place during the current reporting period: Grassland monitoring survey (GMS21-23; Martin *et al.*, in prep.), Callows survey (Martin *et al.* (2022), Survey of three parks (JBA, 2023), NPWS Farm Grassland Monitoring project (Owens & Delaney, 2021), National Fen Survey (Brophy *et al.*, in prep.), miscellaneous surveys carried out by ecologists, and individual polygons mapped for this report from	

	personal communications from a number of ecologists and landowners. There are probably still areas of unmapped 6510 habitat within the country, so the area value entered is a minimum. The GMS21-23 (Martin *et al.*, in prep.) visited 25 sites to assess 6510. Of these, 22 were sites that had been previously surveyed for 6510 by the 2007-12 Irish semi-natural grasslands survey (ISGS; O'Neill *et al.*, 2013), and three had not previously been surveyed by the ISGS. Information on the trends is mostly derived from these data, but it is acknowledged that this is just a subset of the national resource of the habitat, representing 28.9% of the total known area of 6510 in the country. There were recorded losses (since the baseline survey 12 years ago) of 31.49 ha across eleven sites surveyed in GMS21-23, and gains of 43.3 ha across five sites. There was no area change at nine sites. The area gains in the five sites were all considered to be due to nature-positive management such as regular extensive mowing. Gains were most significant in large State-owned park grasslands such as Castletown House, Co. Kildare, and Newbridge Demesne, Co. Dublin. When these gains are offset against the losses, there is a net increase of 11.81 ha of 6510 since the baseline surveys, representing a 14% increase in the corresponding baseline habitat. This value has been entered in section 5.8 for the estimate of short-term trend magnitude and should be regarded as a maximum value. In recent years, through thoughtful and nature-focused management, significant areas of managed demesnes and parks are developing plant communities in their grasslands that are aligned with 6510. These have great value for nature and for people. However, the areas of 6510 at these sites are not directly equivalent to, or a replacement for, 6510 in the wider countryside. The latter is typically in a farmland setting and is embedded in a network of fields, hedgerows and other habitats. Additionally, there will be a cultural tradition of managing land in a certain way, with a farmer or group of farmers typically following traditional practices, often centuries old. It is worth making this distinction in order to emphasise that losses to 6510 in the wider countryside are continuing, and that gains in parklands and demesnes, while undoubtedly welcome, do not fully replace losses in more traditional settings. Positive management practices have been instrumental in these increases in area of 6510. However, significant losses have also occurred, and any habitat loss is of concern, even if the overall area is increasing. The losses documented by Martin *et al.* (in prep.) occur across a larger number of sites (11 sites with losses, compared to five with gains), and all are in the wider, farmed countryside. Of these 11 sites, the habitat was lost entirely from two sites since the baseline survey 12 years ago, both related to agricultural improvement – one due to slurry application, the other due to reseeding. Annual percentage losses at individual sites ranged from 0.08% per annum to 8.33% (where 100% of the 0.6 ha of 6510 habitat was lost). The largest single loss in area was at a site in Co. Roscommon, where losses due to agricultural intensification, noted since the baseline survey, have been ongoing over two monitoring periods; the first 4 ha of loss was recorded by Martin *et al.* (2018), and a further 8 ha was recorded as lost in 2023 by Martin *et al.* (in prep.), with only 0.93 ha of the 6510

	habitat now remaining. The annual loss per year at this site is 5.8%, but higher annual percentage losses have been incurred by smaller sites, where agricultural intensification has been the main driver of loss, with practices such as fertiliser application and reseeding reducing the frequency of high-quality indicators in the sward, and conversion to cattle pasture causing habitat loss or change at three sites. Gains and losses outside of the monitoring network were also recorded while compiling the GIS dataset for this report. Many of the gains were in meadows being managed for nature conservation, e.g., as part of the All-Ireland Pollinator Plan or as part of the NPWS Farm Plan Scheme. Managers of State-owned parks such as Doneraile, Co. Cork and Marlay Park, Co. Dublin, and privately owned parks such as Birr Castle Demesne, have reduced mowing frequency in response to current conservation advice, and the biodiversity value of the meadow grasslands are improving as a result. Favourable Reference Area (FRA) was not determined exactly. However, it is deemed to be 11-25% greater than the current area, given that anthropogenic losses have occurred since the Directive came into force. This evaluation was made by a combination of expert judgement and a reference-based approach using historical data points from the 1960s-1980s. Short-term trend in Area overall was deemed to be *increasing* because the area of 6510 had increased significantly at five of the 25 surveyed sites due to nature-positive management, such as appropriate mowing. Further small gains in sites outside of the monitoring programme were also recorded, including sites managed under NPWS's Farm Plan Scheme. The magnitude of the known change is equivalent to +1.17% per annum, measured over a period of 12 years between this monitoring survey and the baseline survey. The annual change was calculated by estimating the area of change overall recorded during the GMS21-23 (Martin *et al.*, in prep.) and expressing this as a per-annum percentage of the original area. It should be noted that both losses and gains occurred, with most of the gains occurring in larger State-owned properties, and most of the losses being from the wider, farmed countryside, as noted above. The difference in habitat extent between this reporting period and the last is partly due to improved knowledge and partly due to genuine increases. Additional data sources that were available this reporting period include the Callows survey (Martin *et al.*, 2022), NPWS Farm Grassland Monitoring project (Owens & Delaney, 2021), a South Dublin County Council survey of park grasslands (JBA, 2023), a survey from Rathcoole, Co. Dublin (Hodd, 2021), and the National Fen Survey (Brophy *et al.*, in prep.), as well as incidental observations of 6510 habitat by experienced Irish ecologists outside of the monitoring network. These sources contain both previously existing, unreported 6510 and new areas of 6510 that developed due to nature-positive management. Approximately 74 ha of previously existing but unreported possible hay meadow (certainty 1) was included from a digitisation of Heery's ASI Survey (Heery, 1993). The additional 6510

	reported through a combination of improved knowledge and habitat increases during the current round of reporting has resulted in a net increase in the reported area of 6510 from 1.57 km^2 in NPWS (2019) to 3.249 km^2 reported in section 5.2.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***2.171 km²***
		Maximum	***2.171 km²***
	b) Area in not-good condition	**Minimum**	***1.078 km²***
		Maximum	***1.078 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / **increasing** / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	The list of typical species is the same as that used in the 2013-2018 reporting period. One change was made to the assessment criteria: assessment of leaf litter now examines both depth and cover of litter, and a monitoring stop will only fail the litter criterion if it has both more than 25% litter cover and more than 5 cm litter depth. Formerly, only litter cover was examined. The taxa included in the current list of typical species are as follows: *Alopecurus pratensis, Bromus racemosus, Centaurea nigra, Crepis capillaris, Daucus carota, Filipendula ulmaria, Heracleum sphondylium, Hordeum secalinum, Hypochaeris radicata, Knautia arvensis, Lathyrus pratensis, Leontodon autumnalis, Leontodon hispidus, Leucanthemum vulgare, Lotus corniculatus, Pimpinella*		

	major, Plantago lanceolata, Prunella vulgaris, Ranunculus acris, Rhinanthus minor, Sanguisorba officinalis, Tragopogon pratensis, Trifolium pratense, Trisetum flavescens, Vicia cracca, all native orchid species.
6.8 Additional information *Optional*	The percentage of the 6510 habitat with *Favourable* Structure and functions (i.e., in good condition) has increased from 53% in the last reporting period (NPWS, 2019) to 66.8% in the current reporting period. Changes between the percentage of the habitat in good condition reported in NPWS (2019) and the current reporting period are taken to be due to genuine change, as essentially the same assessment criteria were used across both reporting periods (see Martin *et al*., 2018; Martin *et al*., in prep.). There is a possibility that the rate of stop failure in the current monitoring period is slightly lower due to the change in the litter cover/depth criterion, in which the assessment only fails if litter cover of 25% is accompanied by litter depth of more than 5 cm. However, on examination of the data, only three additional stops out of the 104 stops (2.8%) recorded in this monitoring period would have failed if the old litter criterion was applied, not enough to make a significant different to the results. As an extra check, the number of sites that received *Favourable* and *Unfavourable* condition assessments were compared across this monitoring period and the last. The results from the current monitoring period are again more positive, in that 37.5% of the sites surveyed by the Grassland Monitoring Survey (GMS) of 2021-23 (Martin *et al*., in prep.) were *Favourable*, compared to 16.8% of sites surveyed in the GMS of 2015-2017 (Martin *et al*., 2018). The area of 6510 habitat in good condition was estimated for each of the 23 sites at which 6510 was still extant, based on the percentage of monitoring stops at each site that passed their assessments (i.e., had *Favourable* Structure and functions). The two sites that were deemed no longer to have 6510 habitat due to agricultural intensification were excluded from this analysis; instead, their losses have been reported under Area in section 5 above. The Structure and functions assessment examined the following attributes: number of positive indicator species in, or in the vicinity of, 2x2m assessment plots; presence and cover of non-native species; presence and cover of negative species (including species indicative of agricultural improvement); encroachment of problematic native species such as bracken and scrub; sward height; litter cover and depth; bare soil cover; grazing and disturbance; and the forb-to-graminoid ratio. For 6510, number of positive indicator species was the attribute that failed most frequently, with 29% of stops failing to reach the seven-species threshold. Expert judgement was subsequently applied to pass those plots where six species were found within the plot and a seventh indicator species was found within 20 m of the stop. Forb-to-graminoid ratio was the next most failed criterion, with 22% of stops failing to reach the 40% threshold. Failure of these two criteria may indicate nutrient inputs that favour more competitive species, such as certain grasses, over others that indicate better quality 6510 habitat. For each site, the area in good condition was obtained by multiplying the mapped site area by the percentage of monitoring stops in that

	site that passed the assessment. The total area in good condition for all sites was then calculated. Trend is reported as *increasing*, although this varies across the resource. Using a paired dataset of 13 sites which were assessed both in this reporting period and the last by the respective Grassland Monitoring Surveys of 2015-17 and 2021-23, four were worse (a higher percentage of assessment stops failed the assessment this period than last period), four were the same, and five were better (higher percentage of assessment stops passed). Conservation measures relating to programmes such as NPWS Farm Plan Scheme and to less intensive mowing of State-owned public lands, driven in part by initiatives such as the All-Ireland Pollinator Plan initiated by the National Biodiversity Data Centre, are the main reasons for the increasing trend. The percentage in good and not-good condition was scaled up to estimate the condition of the national area, based on 66.8% of the habitat being in good condition.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA02 Conversion from one type of agricultural land use to another (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	High
PA06 Mowing or cutting of grasslands	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	High
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PM02 Flooding	Ongoing and likely to be in the future	Minority <50%	Medium
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Information on pressures was taken from surveys carried out for the Grassland monitoring survey 2021-23 (GMS21-23) by Martin *et al*. (in prep.).
7.4 Additional information *Optional*	Pressures were assessed on a field-by-field basis by Martin *et al*. (in prep.) for each of the 25 6510 sites surveyed during the GMS21-23. These included fields in which 6510 was recorded in this monitoring period, and fields in which 6510 had been recorded in the last monitoring period but was no longer 6510 in the current monitoring period. Each field was assigned at least one pressure code, with PX04 used if no pressures were noted. The intensity of each pressure was assessed, and an approximate assessment was made for the intensity of the pressure across the whole 6510 survey area. The high and medium pressures and threats recorded during this reporting period broadly match those recorded during the previous reporting period. In terms of the percentage of the total 6510 survey area impacted by pressures, the top three negative pressures were PA13 'Application of natural or synthetic fertilisers', which impacted on 8.6% of the 6510 area surveyed; PM02 'Flooding', which impacted on 7.8% of the 6510, and PA08 'Extensive grazing or undergrazing', which impacted on 5.0% of the 6510. The effects of supplementary feeding caused impacts such as trampling and the spread of undesirable agricultural weeds, impacting on 3.4% of the habitat. Small-scale reseeding with *Lolium perenne*, e.g. along the edges of tracks within the habitat, was coded under PA25 'Other agricultural activities', and this impacted on 1.8% of the habitat. Cumulatively, inappropriate management for agriculture (pressure codes beginning with PA_) had a high impact on 14% of the area of 6510 surveyed. Flooding, while a natural part of the callows agricultural cycle, nonetheless impacted on mowing frequency of the habitat. Prolonged flooding meant that the meadows could not be mown for at least one year, with a subsequent build-up of leaf litter and tussocks. Such impacts should be temporary, and restoration of the habitat should be possible with the resumption of normal management. However, these habitats are vulnerable to surges in river levels, which may be exacerbated by changing weather patterns due to climate change. No negative pressures were recorded at 10 (40%) of the sites where an assessment was undertaken, covering 71.3% of the 6510 habitat. These sites were all deemed to be managed at an appropriate level, with

	mowing carried out once or twice a year, sometimes followed by after-grazing by cattle. Five of these sites had *Favourable* Structure and functions. Two of them failed the Structure and functions assessment on high cover of *Trifolium repens*, and the other three failed on insufficient indicator species. One failed additionally on insufficient cover of forbs. Some of these issues may be legacy issues from previous management practices. It remains to be seen whether future assessments of those five sites will improve. Climate change and nitrogen deposition from the atmosphere have not been added as impacts, but they are both likely to affect the range and species composition of the habitat (EPA, 2017).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** ***b) Expand the current range of the habitat type (related to 'Range')*** ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / **increase habitat area/** improve habitat condition*

8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	**Active measures:** MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA07 Restoration of Annex I agricultural habitats (incl. re-establish and improve)
8.7 Additional information *Optional*	The area under active conservation management is often difficult to quantify, as conservation measures are not always implemented across the habitat as a whole. As part of the Grassland Monitoring Survey (GMS) 2021-23, Martin *et al*. (in prep.) recorded active (currently being implemented) and recommended (not yet implemented but would benefit the habitat) conservation measures in the 6510 habitat they surveyed, on a field-by-field basis. In addition, the current level of management was broadly assessed, e.g., appropriate, too intense or not intensive enough. Recording the current level of management helped inform the conservation measures, as well as the status of the measure (i.e., active or recommended). So, for example, if mowing was currently being carried out, was maintaining the 6510 habitat and not negatively impacting it (i.e., was being carried out at an appropriate level), then the corresponding conservation measure recorded was MA03 'Maintain existing extensive agricultural practices and agricultural landscape features', and its status was 'Active'. If management levels needed to be introduced or reinstated, then the corresponding conservation measure was MA04 'Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures' and its status was 'Recommended'. In this way, conservation measures, both active and recommended, were recorded in sites surveyed during the GMS21-23 (Martin *et al.*, in prep.). Conservation measures recorded included routine farm activities such as mowing and after-grazing, which form part of day-to-day farm management but have a positive effect on the conservation status of the 6510 habitat, as well as specific measures directly aimed at improving the conservation status of the habitat, such as specific restoration measures like strewing of green hay. Conservation measures were ranked based on their frequency of occurrence across all sites.

	Martin *et al*. (in prep.) ranked the conservation measures, both active and recommended, based on their frequency of occurrence/ recommendation, using the data gathered during GMS21-23. MA03 was the most frequently recorded active measure (recorded in all but one of the sites surveyed) and mainly took the form of maintaining the management practices currently in place that benefit the 6510 habitat, such as extensive mowing. After-grazing was carried out at 11 of the 25 sites with 6510 habitat surveyed by Martin *et al*. (in prep.). The only other active measure recorded by Martin *et al*. (in prep.) was MA05 'Adapt mowing', which was noted in a small number of instances, e.g., where adaptation of mowing had recently commenced in response to an agri-environment plan. MA07 'Restoration of Annex I agricultural habitats' was recorded in sites outside of the monitoring programme, with several anecdotal examples of 6510 habitat restoration taking place. Of the measures recommended, MA05 'Adapt mowing', MA07 'Restoration of Annex I agricultural habitats' and MA09 'Manage the use of natural and synthetic fertilisers' were recommended in 16-18% of fields, to reverse the corresponding pressures reported on in section 7 above. MA09 in particular was seen as a key measure in a number of sites where structure and functions are deteriorating rapidly and typical species are sparse because of slurry spreading. MA07 relates to scattering seeds of local-provenance Yellow rattle (*Rhinanthus minor*), which has been implemented to good effect at a number of sites. MI05 was recorded in one instance to recommend the non-chemical control the (sometimes) problematic native species Ragwort (*Jacobaea vulgaris*). In some cases, the maintenance of non-intensive mowing is undertaken as part of the All-Ireland Pollinator Plan, or through agri-environment schemes such as the Department of Agriculture's ACRES scheme, NPWS Farm Plans, or a local LIFE project or European Innovation Project (EIP). Specific enhancement of the 6510 may not be the focus of such schemes, and indeed the focus may be birds (e.g. Corncrake LIFE) or insects (e.g. the Protecting Farmland Pollinators EIP project) rather than grasslands; but by reducing intensity of management, such schemes often will have a beneficial effect on the non-target habitats, such as 6510, that are enhanced for these species that use meadow habitats. It should be recognised that the management regimes of most 6510 grassland habitats are driven by the landowner rather than by any formal management plan or policy; therefore, the continued operation of the management regimes currently in place is not guaranteed. For landowners who participate in agri-environment schemes, the setup and operation of longer-term schemes (beyond the current 5-year timeframe for schemes such as ACRES, the EIPs and the NPWS Farm Plan scheme) that benefit biodiversity would go some way to reducing uncertainty as regards continuity of management. Areas that are regarded as having the potential to become 6510 habitat under suitable management were also recorded during surveys. These are areas that contain a good suite of indicator species, but which either lack the requisite number or type of indicator species

	or are currently grazed instead of mown; for 6510 habitats, mowing is generally considered essential. These may transition to 6510 over the next 1-2 monitoring periods if nature-positive management is implemented. However, they have not been included in the reported figures for 6510 for this reporting period.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / **Poor** / Bad / Unknown*
	b) Area	*Good / **Poor** / Bad / Unknown*
	c) Structure and functions	*Good / **Poor** / Bad / Unknown*
9.2 Additional information *Optional*	Current Range is 50% less than the Favourable Reference Range. Conservation status of Range is therefore *Unfavourable-Bad*. Short-term trend direction of Range is assessed as *increasing*, with the magnitude of the known gain +0.77% per annum. Future trend of Range is assessed as *positive*, as range is expected to increase, based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Poor*. Current Area is 11-25% less than Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Bad.* Short-term trend direction of Area is assessed as *increasing*, with the magnitude of the known gain +1.17% per annum. Future trend of Area is assessed as *positive*, as area is expected to increase based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Area are therefore *Poor*. Current Structure and functions are assessed as *Unfavourable-Bad* as less than 75% of the habitat is in good condition. Conservation status of Structure and functions is therefore *Unfavourable-Bad.* Short-term trend direction of Structure and functions is *increasing* (for habitat that is in good condition). Future trend of Structure and functions is assessed as *positive*, as they are expected to improve based on the balancing of the threats and conservation measures currently in place. Future prospects of Structure and functions are therefore *Poor*. Section 8.6 lists the main conservation measures being implemented across an estimated 50-90% of the 6510 resource. This mainly consists of mowing, which is carried out on the majority of the habitat, sometimes followed by after-grazing. In many cases, this management is carried out at an appropriate level, but in others, some adjustments to management intensity may need to be made for maximum benefit to the habitat. On balance, however, there are good indications that the improvements in all four parameters – Range, Area, Structure and functions and Future prospects – noted in the current reporting period should continue into the next reporting period. Programmes such as ACRES and the NPWS Farm Plan Scheme are counterbalancing negative trends in some areas, particularly where no	

	conservation management had previously been implemented. On balance, nature-positive management appears to be having a beneficial effect on the habitat. Further positive effects should also result from implementation of the Nature Restoration Law in the next reporting period.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / **Inadequate (U1)** / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* ***improving** / deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): ***genuine change** / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	The Overall Conservation Status has been assessed as *Unfavourable-Bad* for the current reporting period, as it was during the last reporting period. This is due to the current range and area being more than 10%	

	less than the favourable reference values, and the fact that more than 25% of the surveyed area has *Unfavourable* Structure and functions. Overall trend in Conservation Status is assessed as *improving* during the current reporting period. All parameters showed an increasing trend, with range and area both increasing over the last two reporting periods (by 9.3% and 14% respectively) and the percentage of habitat with good structure and functions increasing from 53% in the last reporting period to 66.8% in the current reporting period. Improvements were due to nature-positive conservation management such as extensive mowing. These measures are expected to continue into the next reporting period. In recent years, through thoughtful and nature-focused management, significant areas of managed demesnes and parks are developing plant communities in their grasslands that are aligned with 6510. These have great value for nature and for people. However, the areas of 6510 at these sites are not directly equivalent to, or a replacement for, 6510 in the wider countryside. The latter is typically in a farmland setting, embedded in a network of fields, hedgerows and other habitats. Additionally, there will be a cultural tradition of managing land in a certain way, with a farmer or group of farmers typically following traditional practices, often centuries old. It is worth making this distinction in order to emphasise that losses to 6510 in the wider countryside are continuing, and that gains in other contexts, such as parks and demesnes, while welcome, are not a like-for-like substitute for losses in the wider countryside.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1.566 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	The area given in section 11.1 is the total area of the 6510 habitat in SACs in the country, including some SACs where the habitat is not listed as a Qualifying Interest (QI). The area of 6510 within the SAC network where it is listed as a QI is 1.440 km^2, which is higher than the last reporting period (0.64 km^2) due to the addition of 6510 as a QI in the River Moy SAC, and due to the inclusion in the distribution dataset of extra areas in the River Shannon Callows SAC mapped in the 1980s and 1990s. There were both losses and gains inside and outside of the SAC network during the current reporting period. Actual losses from SACs between 2019 and 2024 totalled 13.99 ha, offset to a degree by gains of 2.47 ha, giving a net loss within the SAC network of 11.52 ha in the 2019-2024 reporting period. Losses within SACs where 6510 is a QI amounted to 13.39 ha and gains were 1.55 ha, a net loss of 12.44 ha. Some of the losses within the SACs were due to repeated flooding preventing management such as mowing resulting in a loss of the 6510 plant community, but other losses were due to inappropriate management practices such as slurry spreading, or by reseeding and conversion to cattle pasture. This contrasts with the area outside of the SAC network. Actual losses of 6510 outside the SAC network totalled 10.47 ha. However, this was more than offset by gains, which amounted to 40.65 ha. The majority of these gains were recorded in State-owned public parks and demesnes that have been consistently managed by sustained annual mowing for the last 10 years or so, with conservation condition steadily improving year after year. The net change in 6510 habitat outside of the SAC network is an increase of 30.17 ha.

	Although the majority of losses of 6510 habitat over the last two reporting periods occurred outside the SAC network, a net loss of 18.05 ha occurred within the SAC network, including two SACs which list 6510 as a QI – the River Shannon Callows SAC and the East Burren Complex SAC. Losses within these two SACs amounted to 16.19 ha, although this was partially offset by a slight increase (1.74 ha) in one part of the River Shannon Callows SAC, largely at the expense of Annex I habitat 6410. The net loss recorded in the River Shannon Callows SAC alone was 11.52 ha, which was mainly the result of increases in nutrients caused by agricultural intensification, reported in the 2015-17 monitoring survey (Martin *et al.,* 2018) and which are still ongoing in the current period. The short-term trend of the habitat area in good condition within the SAC network is *stable* overall, a less positive situation than across the entire resource as most of the improvements in condition took place outside of the SAC network. During the current reporting period, three of the seven 6510 sites within SACs that were assessed in both this reporting period and the last were better in the current reporting period, two were worse and two were the same.

12 Complementary information *N/A*

Hay meadows (6510)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	***IE***
1.2 Habitat code / name	**7110 Active raised bogs***
1.2i Habitat short name	**Raised bog (active)***
1.3i Habitat description	Raised bogs are accumulations of deep acid peat (3-12 m) that originated in shallow lake basins or topographic depressions. They have a typical elevated surface or dome, which develops as raised bogs grow upwards from the surface (Fossitt, 2000). The bog dome is primarily rainwater-fed (ombrotrophic) and isolated from the local groundwater table. This gives rise to acid conditions deficient in plant nutrients, which in turn support a distinctive suite of vegetation types. Although low in overall diversity, raised bogs support specialised plant assemblages dominated by a range of mosses of the genus *Sphagnum*. The bog surface may support a patterned micro-topography of pools, hummocks and lawns that provide a range of water regimes supporting different species assemblages. Intact raised bogs are characterised by the presence of ericoid and Cyperaceae species and an abundance of *Sphagnum* species. Irish raised bogs are classified as Oceanic raised bog mire (Moore & Bellamy, 1974). This mire type has a very restricted distribution on the Atlantic fringe of the north-west of Europe. The vegetation of a typical, intact raised bog is assigned to the *Oxycocco-Sphagnetea* and to the *Erico-Sphagnetum magellanici* phytosociological association (White & Doyle, 1982). Recently, the Irish Vegetation Classification (Perrin, 2018) assigned Active Raised Bog (ARB) to vegetation communities within two main bog vegetation groups: *Rhynchospora alba-Sphagnum cuspidatum* (BG1) and *Erica tetralix-Sphagnum capillifolium* (BG2). Raised bogs are more abundant in the lowlands of central and mid-west Ireland. In Ireland raised bogs are confined to areas with an annual rainfall below 1,250 mm (Hammond, 1984). They occur principally on land below 130 m and are classified into two sub-types: Western raised bogs (or Intermediate) and True Midland raised bogs (Schouten, 1984), with the boundary between the two being taken as the 1,000 mm isohyet. ARB is characterised by the presence of an acrotelm, which is defined as the living, actively growing upper layer of a raised bog, the surface of which is composed mainly of living bog bosses (*Sphagnum* spp.). The presence of the acrotelm is vital to a raised bog as this is the peat-forming layer and it strongly influences the rate of water runoff. In an Irish context, ARB encompasses active peat-forming ecotopes (central and sub-central) as defined by Kelly (1993) and Kelly & Schouten (2002), and actively peat-forming flushes. Bog Woodland habitat (91D0) is also peat-forming and, when found on the high bog, is also classed as ARB habitat (7110). Depressions on peat substrates of the *Rhynchosporion* (7150) are also frequently found within ARB habitat (7110). Up until this reporting period ARB was defined as occurring only on the high bog. However, a growing acknowledgement of the occurrence of peat-forming vegetation on cutover areas at some sites

	led to an appraisal of these habitats and a methodology was developed by Smith & Crowley (2020) for assessing whether an area of high *Sphagnum* on cutover corresponds with ARB based on numbers of positive indicator species, *Sphagnum* cover and absence or low levels of negative indicator species. This is the first time that ARB has been recognised as occurring on cutover in the Irish context. In general, however, regenerating ombrotrophic vegetation on cutover characterised by a high *Sphagnum* cover (i.e. greater than 40-50% cover), lacks the diversity of *Sphagnum* species, micro-topographical features and good quality indicators associated with ARB. These cutover areas have the capacity to develop into embryonic ARB but longer time periods (>30 years) are likely to be required for high quality ARB to develop.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2019-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The new habitat distribution map is a reviewed version of the 2019 map and is based on a combination of: – surveys undertaken from 2019-24 accounting for 937 ha (51% of national resource). This in turn was composed of a) detailed habitat surveys (to ecotope level) accounting for 925 ha; b) walkover surveys accounting for 6 ha; and c) cutover surveys accounting for 6 ha – unaltered ecological data collected from 2011-18 accounting for 579 ha (31% of national resource). This in turn was composed of a) detailed habitat surveys (to ecotope level) accounting for 555 ha; and b) desktop analysis of aerial imagery accounting for 22 ha – desktop analysis (using aerial imagery) of data collected pre-2010 accounting for 337 ha (18% of national resource). Most of this data was from ecotope surveys undertaken pre-2010. The new distribution map differs slightly from the one reported in 2019 (where a total of 113 10x10 km grid cells were considered to intersect areas containing ARB). New data gathered in the current reporting period show that a total of 118 grid cells intersect habitat records. ARB was likely lost from one cell (R89) in Tipperary due to peat exploitation during the reporting period. All other differences are

	due to either improved knowledge or the recognition that ARB can also occur on cutover. Improved knowledge (through survey work) established that ARB was unlikely to be present in one grid cell (N25) in Longford. It was also unlikely to have been present in 2019. New records of ARB were recorded from two grid cells in Tipperary (S25 and R98) and one in Kilkenny (S27). These three new records are a result of better knowledge of the habitat's distribution (through field surveys), rather than an actual increase in habitat extent. ARB was also newly recorded on cutover bog from one grid cell in Tipperary (S14), one cell in Leitrim (G94), one in Longford (N38) and one in Clare (R66). These four records were also the result of better knowledge of the habitat's distribution, rather than an actual increase in habitat extent, as well as a result of the recognition of ARB occurring on cutover.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic,*** *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	BNM (2025) Cloonboley Bog Complex Ecotope Survey Report 2024. Report prepared by the Bord na Móna Ecology Team. Crushell, P., Crowley, W., Vanmechelen, A., Kirwan, B. & Foss, P.J. (2022) County Tipperary Wetlands Survey. Mapping Project and Field Survey 2022. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P. (2023) County Tipperary Wetlands Field Survey II 2023. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Delaney, E., Gallagher, M. C., O'Sullivan, J. Smith, G. F. and Vanmechelen, A. (2024) Ecotope Mapping within a sub-set of designated raised bogs. A report to the National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J., Overy, P. & Foss, P. (2024) County Tipperary Wetlands Field Survey III 2024. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J., Overy, P. & Foss, P. (2024d) County Leitrim Wetlands Field Survey III 2024. Report prepared for Leitrim County Council. Crushell, P., Gallagher, M.C. & Foss, P. (2021) Title: County Leitrim Wetlands Field Survey 2021. Report prepared for Leitrim County Council. Derwin, J. & MacGowan, F. (2000) Raised Bog Restoration Project: A Continuation of the Investigation into the Conservation and

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4 Range

Range within the biogeographical/marine region concerned	
4.1 Surface area	***19,400 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	*0%*
	b) Estimated Maximum	*0%*
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2001 - 2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	*0%*
	b) Maximum	*0%*
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

4.12 Favourable reference range	***a) 22,600 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ ***Model-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Expert opinion*	
	☐ ***Other (elaborate in Additional information 4.14)***	
4.13 Range when Directive came into force *Optional*	**22,600 km²**	
4.14 Additional information *Optional*	ARB Favourable Reference Range (FRR) corresponds with the current ARB range plus the Degraded Raised Bog (DRB) (7120) range, based on the definition of the latter which states that it is still capable of regeneration within a 30-year period if appropriate measures are put in place (i.e. no major impacting activities are present and any necessary restoration works are implemented). DRB range is based on an eco-hydrological model. The FRR is 226 10x10 km grid cells (22,600 km^2), which is larger than the 21,700 km^2 reported in 2019. This increase is the result of better knowledge of the habitat (i.e. additional surveys and the recognition that ARB can also occur on cutover) rather than an actual change. There has been no actual change in the ARB range during the reporting period. Range was deemed to have remained stable in the last three reporting periods (Fernandez *et al*., 2005, 2014), and thus the range of ARB is also given a *stable* trend in the long (2001-2024) and short (2013-2024) terms. The Current Range (CR) is 14.2% below the FRR. A CR value more than 10% below the FRR value is considered to be *Unfavourable-Bad*.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area	**a) Minimum**	

(in km²)	**b) Maximum**	
	c) Best single value	***18.53 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable /* ***increasing*** */ decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***5.0%***
	b) Estimated Maximum	***6.0%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.11 Long-term trend Period *Optional*	***2001-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	***10.0%***
	b) Maximum	***30.0%***
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 41.59 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ ***Model-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	***26.3 km²***	
5.17 Additional information *Optional*	A network of sites has been designated across Ireland to aid the conservation management of the two habitats listed in Annex I of the EU Habitats Directive that are associated exclusively with raised bogs: the priority habitat Active Raised Bogs (ARB, 7110) and Degraded Raised Bogs still capable of natural regeneration (DRB, 7120). These	

	two habitats are intimately linked, with the conservation goal being to turn all DRB into ARB. Fifty-five sites have been designated as Special Areas of Conservation (SACs) for ARB and an additional seven sites designated for DRB. In addition, Ireland's Natural Heritage Area (NHA) network for raised bogs currently consists of 75 sites. A review of the NHA network was undertaken in 2014, with 36 sites (including seven partially) proposed for retention as NHAs, 46 (including seven partially) proposed for de-designation and 25 new sites proposed for designation. Following legislative changes this review will be updated and concluded, and the network reconfigured accordingly. NPWS (2017) estimated the area of ARB present in 1994 (the year in which the Habitats Directive came into effect) to be 19.4 km^2 in the original network of SACs, 4.9 km^2 in the original network of NHAs and 2.0 km^2 within non-designated bogs of potential conservation value. This gives a total estimate of ARB in 1994 as 26.3 km^2. The extent of DRB in 1994 is estimated to have been 6.5 km^2 in the original network of SACs, 5.2 km^2 in the original network of NHAs and 6.3 km^2 in non-designated bogs. This gives a total estimate of DRB in 1994 as 18.0 km^2. Using these figures (NPWS, 2017), the maximum extent of ARB achievable in 1994 was 44.3 km^2. A revised ARB Favourable Reference Area was set by NPWS (2019) at 41.59 km^2 and derived by summing the estimated 2018 areas of ARB and DRB. The current extent of ARB estimated at 18.53 km^2 is a reviewed version of the 2018 figure estimated by Fernandez & Eakin (in prep.) and is based on a combination of: – surveys undertaken from 2019-24 accounting for 937 ha (51% of national resource). This in turn was composed of: a) detailed habitat surveys (to ecotope level) accounting for 925 ha; b) walkover surveys accounting for 6 ha; and c) cutover surveys accounting for 6 ha – unaltered ecological data collected from 2011-18 accounting for 579 ha (31% of national resource). This in turn was composed of: a) detailed habitat surveys (to ecotope level) accounting for 555 ha; and b) desktop analysis of aerial imagery accounting for 22 ha – desktop analysis (using aerial imagery) of data collected pre-2010 accounting for 337 ha (18% of national resource). Most of this data was from ecotope surveys undertaken pre-2010. An increase in the national extent of ARB is reported in 2024 (7.0% increase compared to that reported in 2018) for the first time since Article 17 reporting began. This increase is estimated at 122 ha but considering that a c. 1.0-2.0% decrease in the extent of ARB (equating to c. 15-35 ha) was estimated in the last reporting period (2013-18), the overall increase in the extent of ARB in the short term (two reporting periods) is estimated to be 5.0% to 6.0%. However, because of the large losses of ARB reported in the late 1990s and early 2000s (NPWS, 2008), over the long term (four reporting periods) there has been an estimated decrease of between 10-30% since 2001.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.73 km²***
		Maximum	***0.73 km²***
	b) Area in not-good condition	**Minimum**	***13.56 km²***
		Maximum	***13.56 km²***
	c) Area where condition is not known	**Minimum**	***4.24 km²***
		Maximum	***4.24 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / **increasing** / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*			
6.8 Additional information *Optional*	Site-specific conservation objectives (SSCOs) have been developed by NPWS for all 55 SACs where ARB is a qualifying interest (https://www.npws.ie/protected-sites). Under these objectives, ARB is assessed as being in good condition when at least 50% of the ARB habitat is composed of high-quality bog vegetation which is considered to be central ecotope and/or active flushes/bog woodland. On the basis of this 50% threshold, ARB is considered to be in good condition at only one SAC, Carrowbehy/Caher Bog SAC (000597), where 72.8 ha is present. Thus, within the SAC network, ARB is in good condition in 0.73 km^2 (6.1% of the network). The condition is unknown in 1.65 km^2 (13.7%) where ecotope surveys have not been undertaken since prior to 2010, and in the remaining 9.67 km^2 (80.2%), the ARB is not in good condition.		

	In the last reporting period, Fernandez & Eakin (in prep.) reported the ARB within three SACs to be in good condition; Carrowbehy/Caher Bog SAC (000597), Ballynamona Bog and Corkip Lough SAC (002339) and Mongan Bog (SAC 000580). The most recent survey of Mongan Bog estimated that high quality vegetation accounted for only 43% of the ARB so the ARB on Mongan is no longer considered to be in good condition. However, a reassessment of the previous data for Mongan estimates that high-quality vegetation did not account for 50% of the ARB at that time either. The data for Ballynamona Bog and Corkip Lough SAC is 25 years old and the condition of ARB on this site is now considered unknown. Nationally, ecotope surveys undertaken since 2010 across 2.22 km^2 of ARB in NHAs proposed for retention revealed that the ARB within these bogs was assessed as not in good condition. Recent ecotope surveys of Bord na Móna (BnM) sites have also revealed the 1.67 km^2 of ARB to be in not-good condition using the 50% threshold of high-quality ARB listed above. Thus nationally, it is estimated that 0.73 km^2 (3.9%) of ARB is in good condition, 13.56 km^2 (73.2%) of ARB is not in good condition, and the condition is unknown in 4.24 km^2 (22.9%) of ARB. Thus, extent of the surface area in good condition within SACs (and nationally) is assessed as being *stable* in the short term. ARB Structure and functions conservation status and condition assessments are based on the variation in the extent of the best quality vegetation types within the reporting period as described by NPWS (2019). At national level the ARB Structure and functions target is for 50% (20.79 km^2) of the national area target (41.59 km^2) to correspond with the best quality vegetation. The current extent of this vegetation type is 4.28 km^2 and thus it is 80% below the target. As this figure is more than 25% below the national target, ARB Structure and functions are given an *Unfavourable-Bad* assessment. The same assessment was given in 2018 (NPWS, 2019). The analysis of Structure and functions during the reporting period was largely restricted to the 46 bogs for which a conservation condition assessment was undertaken. Across these 46 bogs, a 0.01 km^2 increase in the best quality vegetation was assessed with increases in central ecotope/active flush/bog woodland on 13 sites (11 from restoration works and two associated with recovery from a fire) and decreases on eight. The quality of the sub-central ecotope is also improving on the 19 bogs (of the 46) where restoration works were undertaken, with evidence of improvements in quality of sub-central ecotope noted on the Bord na Móna sites that were surveyed during the reporting period also. The overall estimate of 4.28 km^2 occurring nationally is a revised estimate of the 4.17 km^2 estimated in 2018 (NPWS, 2019). The change is accounted for by the slight net increase in high-quality ecotopes in the 46 bogs for which a conservation condition assessment was undertaken, as well as the c. 0.10 km^2 of newly recorded areas (not necessarily newly established) of high-quality ecotopes in 18 other ecotope surveys carried out during the reporting period. The smaller increase in the Structure and functions of ARB compared to the increase in the extent of ARB indicates that achieving the best quality ecotopes takes a longer time after restoration works than merely achieving ARB. An unquantified decline

	in the Structure and functions of ARB was reported in 2018 (NPWS, 2019) for the 2013-18 reporting period. This decline is estimated to be in the same order as the increase reported from 2019-24, and thus over the short term the extent of high-quality vegetation types is estimated to have remained *stable* (although they have decreased and subsequently increased during the reporting period). However, as the quality of the sub-central ecotope has improved on sites where restoration works occurred, overall, the Structure and functions parameter is estimated to have *increased* in the short term.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Whole >90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PK04 Atmospheric N-deposition	Ongoing and likely to be in the future	Whole >90%	Medium
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low
PE02 Shipping lanes and ferry lanes transport operations	Ongoing and likely to be in the future	Minority <50%	Low
PH08 Other human intrusions and disturbance not mentioned above	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	The spread of *Rhododendron ponticum* and conifers such as *Picea sitchensis* and *Pinus contorta* is a minor issue on a small number of sites. In general, on raised bogs, *Rhododendron* tends to be more of a problem on cutovers than on high bog and thus is more likely to

	impact on peat-forming habitats on the cutover than on ARB on the high bog. *Sarracenia purpurea* is also reported from the high bog on a small number of sites.
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Air Pollution Information System (APIS) https://www.apis.ac.uk/app. Bord na Móna Peatlands https://www.bordnamona.ie/peatlands/overview/. Bord na Móna The Peatlands Climate Action Scheme (PCAS) https://www.bnmpcas.ie/. Coll, J., Bourke, D., Gormally, M., Sheehy Skeffington, M. & Sweeney, J. (2013) Winners and Losers: Climate Change Impacts on Biodiversity in Ireland. Project Report. Environmental Protection Agency. Crushell, P., Crowley, W., Delaney, E., Denyer, J., Fernandez, F., Foss, P., Gallagher, M.C., O'Sullivan, J., Overy, P., Smith, G.F. & Vanmechelen, A. (2025) Active and Degraded raised bog conservation status assessment for the 2019-2024 period. *Irish Wildlife Manuals*, No. 1XX. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. DAFM (2024) Land Types for Afforestation: Soil and Fertility, Department of Agriculture, Food and the Marine, Johnstown Castle Estate, Wexford. Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge of Climate Change Impacts for Ireland. CCRP Report No. 223. Environmental Protection Agency, Johnstown Castle, Ireland. Donnelly, A., Caffarra, A., Albanito, F. & Jones, M. (2008) "The impact of climate change on semi-natural ecosystems in Ireland (Chapter 5)". In *Climate change in Ireland: Refining the impacts*, Edited by: Sweeney, J. 132–159. Dublin: Environmental Protection Agency. Fernandez, F. & Eakin, M. (in prep.) Active raised bog, Degraded raised bog and Depressions on peat substrates of the Rhynchosporion conservation status assessment. *Irish Wildlife Manuals,* No. 1XX. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Jones, M.B., Donnelly, A. & Albanito, F. (2006) Responses of Irish vegetation to future climate change. *Biology and Environment: Proceedings of the Royal Irish Academy*, 106B(3), 323–334. Kelleghan D.B., Hayes, E.T., Everard, M. & Curran, T.P (2019) Mapping ammonia risk on sensitive habitats in Ireland. *Science of the Total Environment,* 649, 1580–89. Kelleghan D.B., Hayes, E.T., Everard, M. & Curran, T.P (2020) Assessment of the impact of ammonia emissions from intensive

	agriculture on special areas of conservation and special protection areas. EPA Research Report No. 347. Wexford, Ireland. Kelleghan, D. B., Hayes, E.T., Everard, M., Keating, P., Lesniak-Podsiadlo, A., & Curran, T.P. (2021) Atmospheric ammonia and nitrogen deposition on Irish Natura 2000 sites: Implications for Irish agriculture. *Atmospheric Environment,* 261, 118611. NPWS (2014) Review of Raised Bog Natural Heritage Area Network. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. O'Loughlin, B. (2022) Peatland Restoration: Raised Bog Ecotope and Cutover Habitat Survey of Shanakyle Bog, Co. Clare. Report prepared for the Department of Agriculture, Food and the Marine (DAFM) and Shanakyle Bog Restoration Group.
7.4 Additional information *Optional*	PC05 Peat extraction (includes drainage associated with peat extraction): Although peat cutting continues both within the SAC and NHA network and on non-designated sites in 2024, the amount and the intensity of the cutting has decreased within the SAC network. In 2024, 16 of the 62 raised bog SACs (26%) were cut, with an estimated total of 185 plots cut across these 16 sites. This is down 39% from the estimated 308 plots cut across 22 SACs at the end of the last reporting period in 2018. The average number of plots cut during the current reporting period per year across the SAC network was 264.2, which is a 15.5% decrease from the average of 312.8 cut per year during the last reporting period. The average number of SACs cut per year has also decreased, this time by the higher amount of 35.5% from an average of 25.3 sites per year in the last reporting period to 16.3 during the current reporting period. Cutting within the NHA network was assessed using aerial photos (mainly Bluesky and World Imagery from 2020-22). The assessment looked at cutting within the current NHA network as well as the proposed new network and the results indicated the following: – 50 of the 75 current NHAs were cut at some point over the reporting period. Of the 50 sites cut, five were classed as having a very low intensity of cutting, ten as a low intensity, ten as a moderate intensity, eleven as a high intensity and fourteen as a very high intensity. All 35 of the sites with a cutting intensity classed as moderate or higher are proposed to be de-designated. – 12 of the 25 NHAs proposed for designation were cut at some point over the reporting period (note than in some cases only one plot was cut within the site). The cutting intensity on seven of the 12 was very low (≤5 plots) with only four sites classed as having a moderate to high amount of active cutting over the reporting period. – Within the proposed new network of NHAs (i.e. those proposed for retention and those newly proposed) turf cutting was recorded on 22 of the 61 sites. The cutting intensity on 13 of the

	22 was very low, on five was low, on two was moderate and on two was high over the reporting period. The aerial photo assessment suggests that, while there is limited cutting within the proposed new NHA network, cutting (and associated drainage) in the current NHA network is widespread. No analysis was made of cutting on non-designated sites. Where turf cutting continues, the drainage associated with it is included within this pressure. Where turf cutting has ceased, but the drainage associated with the activity remains, this drainage is reported under the more general pressure, PL02 Drainage. Very little new drainage (associated with turf cutting) was inserted into any of the raised bogs that are designated as SAC or the NHAs proposed for retention during the reporting period, the exception being the continuation of cutover drains in towards the facebank where cutting is continuing. However, drainage was inserted during the reporting period on some of the NHAs that are proposed for de-designation as well as non-designated sites. During the current reporting period turf cutting (or associated drainage) was reported from 18 of the 46 bogs (39%) for which a conservation condition assessment was undertaken. A high impact on ARB was reported from 16 of these and medium on two. On these two sites cutting was taking place in only one plot and restoration measures have been undertaken. PL02 Drainage: In previous reporting periods, all drainage, whether associated with turf cutting or not, was reported under this heading. However, for this reporting period, the drainage reported under PL02 relates to drainage not associated with turf cutting or to drainage that may have been associated with turf cutting in the past, but where no cutting took place during the reporting period. During the current reporting period, of the 46 bogs where a conservation condition assessment was undertaken, general drainage was reported from all the sites where turf cutting and associated drainage was not reported. It was considered to have a high impact on 64% (18 of 28) of the sites where it was reported, medium impact on 7% and low impact on 29%. All sites recorded as low impact have undergone substantial restoration works which have reduced the impact of drainage. PK04 Atmospheric Nitrogen Deposition: Agriculture is the dominant source of these emissions (Kelleghan *et al*., 2019, 2021) and arguably this pressure could be reported under PA20 Livestock farming generating pollution, but more research is needed. A study of five raised bog SAC sites by Kelleghan *et al*. (2021) found that all five sites exceeded the higher band of the critical load range (10 kg N/ha/year) with rates of 10.1–17.32 kg N/ha/year. Kelleghan *et al*. (2019, 2020) have also modelled over 90% of Ireland's raised bog SACs as being above Critical Levels for atmospheric ammonia. During ecotope surveys of 46 bogs in the reporting period, impacts of nitrogen deposition such as *Sphagnum* hummocks degrading, high amounts of algal growth on *Calluna* stems and *Xanthoria* lichen species on birch were recorded on a number of sites, with the impacts classed as high on four of the 46 bogs (9%) assessed. A medium impact was estimated

	on 18 of the 46 bogs (39%) and a low impact estimated on 24 bogs (52%). PB including PB24 Drainage for forestry and PB01 Afforestation: Conifer plantations (totalling 428.9 ha) across 22 SACs and 22 NHAs have been identified as being necessary to remove in order for sites to achieve favourable conservation status. All conifer plantations have associated drainage, and this can continue to impact ARB after conifers are removed. Furthermore, the drainage associated with conifer plantations can make restoration difficult as, unless enhanced measures are undertaken, the ridge and furrow modification of the surface remains as a legacy giving drier-loving non-bog plants and conifers and birch a niche to re-colonise. Once these begin to grow, they contribute to lowering the water table in the area once again. Enhanced measures can be used to combat this. During the current reporting period plantations were reported as an impact on 19 of the 46 bogs (41%) for which a conservation condition assessment was undertaken. The impacts were classed as high on three of the bogs (7%), medium on ten (22%) and low on six bogs (13%). PA22 Drainage for Agriculture: During the current reporting period, drainage (both pre-existing and new) for use as agricultural land was reported as potentially impacting on ARB from 15 of the 46 bogs (33%) assessed, with an imperceptible impact on Annex I habitats estimated on three of the 15 bogs, a low impact estimated on three, a medium impact on seven and a high impact on two bogs. Note that it can be difficult to estimate the impact of this activity, and further investigations are necessary to refine the assessment. Drainage works for agriculture took place within 11 of the 15 bogs during the reporting period. PJ Climate change (includes PJ01 Temperature Changes and PJ03 Changes in precipitation regimes): Donnelly *et al.* (2008) identified raised bogs as one of Ireland's habitats that is most vulnerable to the impacts of climate change. Longer and drier summers are expected to promote an increased decomposition of peatlands and the Suitable Climatic Area (SCA) of the habitat in Ireland is predicted to decline by 32% by 2055 and by 38% by 2075. Coll *et al.* (2013) project a marked contraction of the SCA around the Central Plain, with substantial losses and fragmentation at the southern edge of the distribution. They also indicate that the current protected network will need to adapt to these changes, and they state that restoration will improve the extent, integrity and resilience of the habitat. On the whole, Desmond *et al*. (2017) recognise that the potential impact of climate change on Ireland's peatlands remains highly uncertain, derived from the combined uncertainty in the projections for climate change itself, including the uncertainty in predictions for changing levels of precipitation, and the lack of knowledge on the current vulnerability of much of Ireland's peatlands. Of the 46 bogs assessed during the reporting period, climate change was estimated to be a medium threat on 19 bogs (41%) and a low threat on 27 bogs (59%). Although the pressure from climate change is expected to increase, an increase in resilience to the negative effects of climate change is expected through the implementation of site-specific restoration plans at bogs within SACs and NHAs proposed for retention.

	PH08 Other human intrusions and disturbance (Burning): All burning that impacts ARB or DRB is reported under this category. However, the cause of the fire is not always known. On the 46 bogs assessed during the reporting period, the impacts of fire were recorded on six (13.0%). A total of c. 170 ha of high bog vegetation was burned across four bogs during the reporting period, with a further 15 ha across two bogs burned in the year or two immediately prior to the reporting period. The activity is assessed as having a high impact on ARB on one bog, medium on three and low impact on ARB on two of the bogs. Other impacting activities on ARB which have been reported as occurring less commonly include PI02 Other invasive species, PI01 Problematic native species, PA01 Conversion into agricultural land (excluding drainage and burning) and PE01 Roads, paths, railroads and related infrastructure (and associated drainage). Invasive (and problematic native) species cause negative impacts on a limited number of sites and are not in general considered a major threat to raised bog habitats. In addition, the implementation of site-specific restoration plans is likely to reduce the pressure from these threats.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** ***b) Expand the current range of the habitat type (related to 'Range')*** ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / **increase habitat area**/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MC02 Adapt/manage exploitation of energy resources MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure MK03 Restoration of habitats impacted by multi-purpose hydrological changes MB14 Manage drainage and water abstraction for forestry (conifer plantation removal and restoration of drained areas) MI03 Management, control or eradication of other invasive alien species MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MA14 Other measures related to agricultural practices
8.7 Additional information *Optional*	MC02 Adapt/manage exploitation of energy resources: This includes actions such as the designation of a site as an SAC or NHA (and subsequent development of site-specific restoration plans and drainage management plans), the NPWS compensation schemes, wider engagement by NPWS and preparatory actions (in advance of restoration works) such as refinement of original restoration plans, development of best-practice restoration methodologies, stakeholder engagement and the signing of landowner agreements. All of these, as well as the growing environmental awareness of landowners, has led to a decrease in the extent of turf cutting, and an increase in readiness to implement restoration works. The NPWS and the Department of Housing, Local Government and Heritage has committed significant resources to eliminating the impacts from turf cutting activity within designated sites, particularly SACs and the NHAs that are proposed for retention within the current network. This includes the application of the Cessation of Turf Cutting Compensation Scheme (CTCCS) to the NHAs proposed for retention and implementation of a turf-cutting relocation programme. These measures have reduced turf-cutting trends within SACs and the NHAs

	that are proposed for retention. Overall, across the designated network, turf cutting has decreased as a result of the control of turf cutting by 35.5% (on a site basis) from an average of 25.3 SACs cut/year in the last reporting period (2013-2018) to 16.3 cut/year in the current reporting period (2019-2024). The same detailed analysis is not available for the NHAs proposed for retention, but analysis of aerial photos suggests that turf cutting decreased from 21 cut in the 2013-18 period to 13 cut post-2018 (38.1% decrease). The average number of plots cut during the current reporting period per year across the SAC network was 264.2, which is a 15.5% decrease from the average of 312.8 cut per year during the last reporting period. This marked downward trend in turf cutting activity is not visible in the NHAs proposed for designation or the NHAs proposed to be de-designated. Neither is there clear evidence to suggest a downward trend across non-designated sites. However, one clear positive change across non-designated bogs is the decision of Bord na Móna to cease turf cutting, with the company's last full peat harvest taking place in 2018, followed by a partial harvest in 2019 and a full suspension of harvesting operations in 2020. Following on from this, further positive change is anticipated as a result of works undertaken by the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS), a large-scale project, running from 2021-26, aimed at rehabilitating and restoring previously harvested peatlands. Further positive change is also anticipated as a result of the recent work undertaken by the Environmental Protection Agency (EPA) in halting commercial peat harvesting operations. With a view to the management of the SACs and NHAs, site-specific restoration plans have been developed for all 62 raised bog SACs and the 36 NHAs proposed for retention. These detailed plans identify the drains that need to be blocked as well as any other measures such as bunding that may be needed for the site to achieve favourable conservation status. The plans are currently being implemented by the NPWS, with works undertaken on 31 designated sites (23 SACs and 9 NHAs) from 2018 to 2024 under the national raised bog restoration programme and the EU LIFE project The Living Bog. MC07 Habitat restoration/creation from resources, exploitation areas (drain blocking): This is included as a conservation measure where drains associated with turf cutting activities (past or present) have been blocked as part of restoration works. It also includes any drains along (turf-cutting) access tracks that were blocked. Such actions proposed under the national raised bog restoration programme continue to be rolled out by the NPWS. The restoration plans drawn up for each bog within a designated site estimate the lengths of drains proposed to be blocked within each bog. An estimated 3,617 km of drains need to be blocked in total across SACs and NHAs proposed for retention. An estimated 1,566 km (43%) of these drains had been blocked by November 2024, with 525 km (34%) of those drains blocked within the reporting period. Within the SACs, 942 km (39%) of drains proposed to be blocked had been blocked by November 2024, with 343 km (36%) of those drains blocked within the reporting period. Within the NHAs proposed for retention, 624 km (51%) of drains proposed to be blocked had been

	blocked by November 2024, with 183 km (29%) of drains blocked within the reporting period. In total, drains were blocked within 40% of SACs (22 sites) and 25% of NHAs proposed for retention (9 sites) during the reporting period. MK03 Restoration of habitats impacted by multi-purpose hydrological changes (enhanced restoration measures): Actions proposed under the NPWS national raised bog restoration programme include enhanced restoration measures such as trench bunding and contour bunding. The restoration plans drawn up for each bog within a designated site estimate the lengths of bunds proposed to be built as part of the restoration works to be undertaken within each bog. Across SACs and NHAs proposed for retention, 110 km (37%) of bunds proposed to be built had been built by November 2024, with 99% of these bunds constructed within the reporting period. Within the SACs, 72 km (34%) of bunds proposed to be built had been built by November 2024. Within the NHAs proposed for retention, 38 km (48%) of bunds proposed to be built had been built. During the reporting period, bunds were constructed in 14 of the 29 SACs (48%) and 6 of the 18 NHAs (33%) where they have been proposed. The success of bunds built on sites such as Cloncrow Bog NHA has led to a reappraisal of the methods, and further opportunities for bund construction other than what was initially proposed as part of the first phase of the restoration plans is being explored on a site-by-site basis as restoration works are undertaken. MB14 Manage drainage and water abstraction for forestry (conifer plantation removal and restoration of drained areas): Actions proposed under the NPWS national raised bog restoration programme include the targeted removal of specific conifer plantations, the blocking of associated drains and restoration of the associated peatland area. In previous reporting periods, conifer removal and the blocking of associated drains was carried out by Coillte during two separate LIFE projects: LIFE04 NAT/IE/000121, which ran from 2004-08 and undertook works on 14 SACs and LIFE09 NAT/IE/000222, which ran from 2011 to 2015 and undertook works on five SACs and 12 NHAs. The total extent of land within both projects was 1,256 ha: high bog (737 ha) and cutover (519 ha). An assessment of the second LIFE project results highlighted by Fernandez & Eakin (in prep.) indicated that 49 ha of ARB were expected to improve in quality and expand as a result of the restoration works implemented and that these gains are expected to occur not only within the project areas but also within high bog sections adjacent to them. Removal of plantations (totalling 428.9 ha) across 22 SACs and 22 NHAs was identified as being necessary in order for sites to achieve favourable conservation status. Very few conifer plantations were removed during this reporting period, with one small area (0.5ha) removed on Carrownagappul SAC 001242 as part of The Living Bog works and another (0.3 ha) on Cloncrow Bog NHA 000677 as part of CarePeat. A 4.5 ha plantation on the southern cutover of Scohaboy NHA 000937 was also removed by Coillte in late 2024/early 2025. The slow progress in the removal of conifer plantations may in part be due to legal constraints (e.g. there is an obligation to replant an area

	within 2 years of a plantation being felled), which currently exist when undertaking forest-to-bog projects. As mentioned under the pressures/threats section, enhanced restoration measures are usually needed in areas where forestry is removed to combat the ridge/furrow legacy. During the reporting period, the method of stump flipping was trialled on a conifer plantation on one SAC in 2021, and cell bunding was constructed within a former Coillte LIFE area in another SAC in 2024. On a broader scale, peat soils in general have been offered some protection from forestry through the Afforestation Scheme 2023-2027 (DAFM, 2024) as, where there is >30 cm of peat, only native forest types will be considered, and then only where no new drainage is needed. MI03 Management, control or eradication of other invasive alien species: Actions proposed under the NPWS national raised bog restoration programme include the control/eradication of non-native plants such as *Rhododendron ponticum* and *Sarracenia purpurea* as well as conifers, which may have spread onto high bog from adjacent conifer plantations such as *Pinus contorta* and *Picea sitchensis*. Invasives tend not to be a major problem on raised bogs, with the spread of species such as *Rhododendron* generally confined to the cutover. A limited number of invasive species control programmes were undertaken on raised bogs during the reporting period, the most substantial being the control by Coillte of invasives on former Coillte LIFE sites. MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats): Actions proposed under the NPWS national raised bog restoration programme include the targeted blocking or partial blocking of specific agricultural drains that are considered necessary to block in order to achieve favourable conservation status for ARB. In general, the conservation measures prescribed under this action are, so far, proving the most difficult to implement, with prolonged engagement required to progress the blocking of drains associated with agriculture. Such drains were blocked on two of the 46 bogs assessed as part of the monitoring programme, with works on both bogs undertaken as part of an agri-environmental scheme (FarmPEAT), which was specifically designed to incentivise farmers to raise the water table in their peaty agricultural soils on the margin of the bog. The Climate Action Plan (2024) has a target to reduce the management intensity (which includes raising the water table to within 10 cm of ground level) of at least 80,000 ha of drained, agriculturally managed, carbon-rich soils by 2030. If this target is realised, it is likely to have a positive impact on ARB. Targets outlined in the Nature Restoration Law include EU member states needing to develop national restoration plans by 2026, resulting in the restoration of at least 30% of habitats in poor condition by 2030, 60% by 2040, and 90% by 2050. If these targets are realised, they will also likely have a positive impact on ARB. MA14 Other measures related to agricultural practices: Two general agricultural schemes have been launched during the reporting period by DAFM that are likely to have benefits in regard to reducing

	ammonia deposition and/or increasing the water table adjacent to raised bog sites. These are the Low Emission Slurry Spreading (LESS) Scheme and the Agri-Climate Rural Environment Scheme (ACRES). The LESS scheme launched in 2023 (DAFM, 2025) provides funding for farmers to purchase specialist LESS equipment. The use of such equipment reduces the loss of nitrogen gases into the atmosphere from the practice of spreading slurry. The ACRES scheme (DAFM, 2022) has two measures that should reduce nitrogen deposition on raised bog habitats. The LESS measure within ACRES promotes the practice of low emission slurry spreading amongst participant farmers by issuing a payment to farmers for adopting the measure. ACRES also includes an optional results-based scorecard measure for Low Input Peat Grassland available only to farmers with grasslands on peat soil within 500 m of designated raised bogs. This should incentivise farmers to improve the conservation management of these grasslands, a potential result of which is the raising of water tables in areas immediately surrounding designated raised bogs and the reduction of nutrient inputs in grassland in such areas. The capital costs involved in blocking drains etc. may be covered on some western raised bog sites where drain blocking may be funded through Landscape Actions under the ACRES Co-operation approach.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / Poor / **Bad** / Unknown*
	b) Area	*Good / **Poor** / Bad / Unknown*
	c) Structure and functions	*Good / **Poor** / Bad / Unknown*
9.2 Additional information *Optional*	Four (turf cutting and associated drainage, drainage, burning and forestry) of the seven main pressures/threats are expected to have a decreasing impact due to the implementation of conservation measures, one (ammonia deposition) is expected to stay stable and two (drainage for agriculture and climate change) have an increasing threat. However, there is potential to reverse the increasing threat from agricultural drainage in the next reporting period through a number of measures/plans. For example, one of the targets of the Climate Action Plan 2024 is to reduce the management intensity of at least 80,000 ha of drained, agriculturally managed, carbon-rich soils by 2030. This target includes raising the water table to within 10 cm of ground level. Other schemes/laws that may help combat this pressure include the EU Nature Restoration Law, the Low Input Peat Grassland aspect of ACRES and more general regulations under CAP23 such as GAEC2. Thus, although this pressure/threat is currently recorded as increasing, a decreasing trend in the next reporting period is possible. An increasing trend in the impact of each of the seven conservation measures listed above (MC02, MC07, MK03, MB14, MI02, MA13 and MA14) is expected. Although a decreasing trend in negatively impacting activities and an increasing trend in positively impacting ones can be expected in the future, the conservation status of the Area and Structure and functions of the habitat is expected to	

	remain *Unfavourable-Bad* in the next two reporting periods as the extent of ARB is expected to remain >15% below the FRV and the Structure and functions (as percent of habitat in good condition) is expected to remain >25% below the FRV. This is due to the continuation of pressures and threats within and outside of the designated sites and practical challenges in implementing the national restoration ambition. Nevertheless, if these issues are addressed, future prospects can be dramatically improved as works continue to be undertaken as part of the national raised bog restoration programme. Overall, a *positive* trend is anticipated in the Area and Structure and functions of the habitat. The increases in extent and Structure and functions are expected to continue throughout the next two reporting periods, but the magnitude of this increase will depend on, and is subject to, ongoing management and restoration programs being continued and/or initiated as outlined in section 10.8 below. The Future prospects for Range are reported as being *Bad* as the habitat is under threat in non-designated sites, some of which are the only example of the habitat within a 10x10 km grid cell.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2**) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2**) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* ***improving** / deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*

	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	This Article 17 reporting period has recorded the first increase in the extent and Structure and functions of ARB since reporting began. This highlights the progress that has been made in the last number of decades in conserving the habitat. Continued progress is expected, with further increases anticipated in the next reporting period due to the roll-out of the national raised bog restoration programme. However, achieving favourable status for ARB will not occur in the short term or indeed long term unless further measures are implemented. These include: – the designation (and management) of the proposed new network of sites (2 SACs & 25 NHAs) – the discontinuation of negatively impacting activities – the development/establishment of projects aimed at incentivising the restoration/rehabilitation of cutovers in and adjacent to raised bogs – the development of protocols/management procedures aimed at reducing nitrogen emissions from agriculture, particularly in areas adjacent to raised bogs – the further development of appropriate policy on forest-to-bog projects on deep-peat soils – the full implementation of the national raised bog restoration programme	

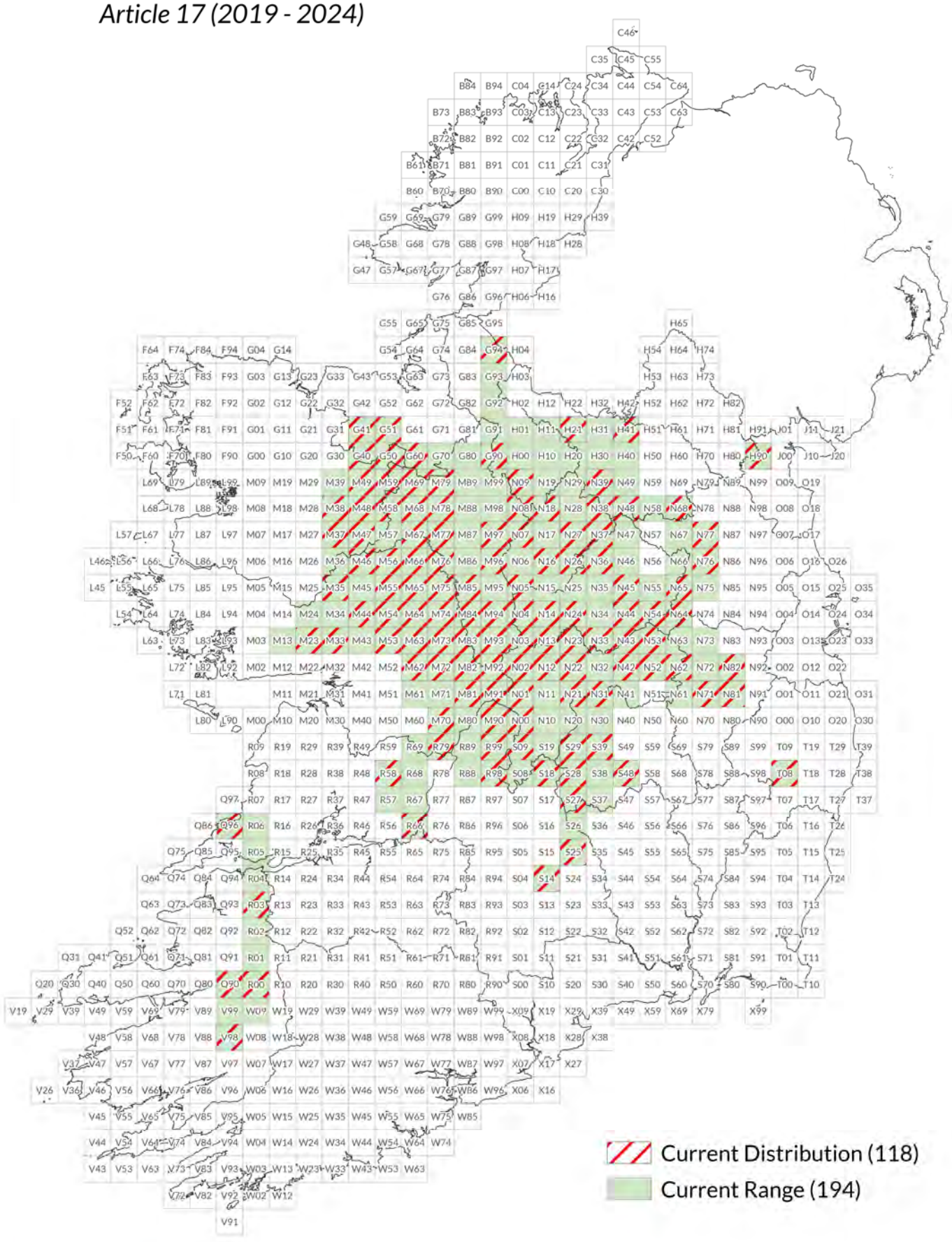
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***12.13 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	The figure provided above of 12.13 km^2 includes 12.05 km^2 of ARB within the 55 SACs for which the habitat is a Qualifying Interest (QI) as well as an additional 0.08 km^2 of ARB within five SACs where the habitat is not a QI. This 12.13 km^2 represents 65% of the entire national extent of ARB. A further 1.28 km^2 of ARB is reported from two proposed SACs where ARB is to be a QI. ARB is estimated to have increased by approximately 17 ha within the SAC network during the reporting period. While the exact losses in the extent of ARB within SACs in the period 2013-18 were not calculated, they are estimated to be in the same region as the increases in the extent of ARB in SACs from 2019-24. Thus overall, in the short term (two reporting periods), the extent of ARB in Ireland's SAC network is believed to have remained *stable* (although it has decreased and then subsequently increased in the intervening years) and is currently increasing. The lack of a significant increase in the short term in the extent of ARB within the SAC network contrasts with the relatively large increase (90 ha) recorded in the two proposed SACs over the same timeframe. The restoration works undertaken on these two sites were particularly successful due to the baseline status of these sites (i.e. bogs had an extensive drainage network which could be blocked to raise the water table). Nonetheless, the extensive restoration works undertaken within the SAC network during the reporting period are anticipated to result in significant increases in the extent of ARB within the network by the time of the next reporting period.

12 Complementary information *N/A*

Raised bog (active)* (7110)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7120 Degraded raised bogs still capable of natural regeneration**
1.2i Habitat short name	**Degraded raised bogs**
1.3i Habitat description	Raised bogs are accumulations of deep acid peat (3-12 m) that originated in shallow lake basins or topographic depressions. They have a typical elevated surface or dome, which develops as raised bogs grow upwards from the surface (Fossitt, 2000). The bog dome is primarily rainwater-fed (ombrotrophic) and isolated from the local groundwater table. This gives rise to acidic conditions deficient in plant nutrients, which in turn supports a distinctive suite of vegetation types. Although low in overall diversity, raised bogs support specialised plant assemblages dominated by a range of mosses of the genus *Sphagnum*. The bog surface may support a patterned micro-topography of pools, hummocks and lawns that provide a range of water regimes supporting different species assemblages. Intact raised bogs are characterised by the presence of ericoid and Cyperaceae species and an abundance of *Sphagnum* species. Irish raised bogs are classified as Oceanic raised bog mire (Moore & Bellamy, 1974). This mire type has a very restricted distribution on the Atlantic fringe of the north-west of Europe. The vegetation of a typical, intact raised bog is assigned to the *Oxycocco-Sphagnetea* and to the *Erico-Sphagnetum magellanici* phytosociological association (White & Doyle, 1982). Recently, the Irish Vegetation Classification assigned Degraded Raised Bog (DRB) to vegetation communities under the two main bog vegetation groups: *Rhynchospora alba – Sphagnum cuspidatum* (BG1) and *Erica tetralix – Sphagnum capillifolium* (BG2) (Perrin, 2018). Raised bogs are more abundant in the lowlands of central and mid-west Ireland. In Ireland raised bogs are confined to areas with an annual rainfall below 1,250 mm (Hammond, 1984). They occur principally on land below 130 m and are classified into two sub-types: Western raised bogs (or Intermediate) and True Midland raised bogs (Schouten, 1984), with the boundary between the two being taken as the 1,000 mm isohyet. DRB is characterised by the complete absence, or at best the presence of thin or patchy cover, of an 'acrotelm' layer. The acrotelm is the living, actively growing upper layer of a raised bog. The acrotelm is vital to the maintenance and development of an active raised bog as this is the peat-forming layer and its presence strongly influences the rate of water runoff. As highlighted in the last report (NPWS, 2019), the definition of DRB changed over that reporting period. DRB is now defined by an eco-hydrological model that was developed based on LiDAR (Light Detection and Ranging) data. The model predicts where there is potential to restore active conditions on the high bog (NPWS, 2017). As a result, only those areas with the right combination of physical conditions (including surface shape, slope and drainage patterns) ultimately capable of supporting Active Raised Bog (ARB) are now

	considered as DRB. These are the areas of raised bogs whose hydrology has been disturbed so that their surfaces have dried out and suffered some species change or loss. Bog species of drier conditions now dominate, and peat formation has ceased. The water level is generally 10 cm or more below the surface and drops to 30+ cm below during dry summer weather. To qualify as DRB, these areas must still be capable of natural regeneration to active bog within 30 years if their hydrology is repaired (usually after restoration works, particularly blocking of drains). The remainder of the high bog that is neither ARB nor DRB is now referred to as 'Supporting Raised bog habitat'. Currently cutover areas are not considered to support DRB. However, the potential of cutovers to support peat-forming vegetation is recognised. Potential peat-forming habitat (PPFH) on cutover is defined using similar methods to that for DRB on the high bog. PPFH is not included under the definition of DRB as it is believed that these areas will require periods longer than 30 years to develop into ARB. For example, Crowley *et al*. (2021) demonstrated that peat-forming habitat can be restored on cutover, but that on their study site after 13 years, it lacked the suite of species to be assessed as ARB.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2019-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range map was submitted. No Favourable Reference Range (FRR) map was submitted as the FRR is 0.0 km^2.
2.5 Additional information *Optional*	The new habitat distribution map is a revised version of the 2019 map, which was based on the eco-hydrological model developed as part of the Review of Raised Bog Natural Heritage Area Network (NPWS, 2014) and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022 (NPWS, 2017). The new distribution map differs slightly from the one reported in 2019 (where a total of 156 10x10 km grid cells were considered to intersect areas containing DRB). New data gathered in the current reporting period also show that a total of 156 cells intersect DRB records, but with a slightly different distribution. From analysis of aerial photography, DRB was potentially lost from one grid cell (S49) in Laois due to peat exploitation during the reporting period. All other differences are due to improved knowledge in the distribution of the habitat with, for example, survey work

	establishing that DRB is likely present in two additional grid cells (S25 and S27) in Tipperary. DRB was likely already present in these cells in 2019. As previously reported (NPWS, 2019), the DRB distribution map does not include areas of 'secondary degraded raised bog' such as highly drained high bog devoid of vegetation or cutover/cutaway bog. Such areas do not correspond with the strict definition of DRB within the Habitats Directive Interpretation Manual as, although the re-establishment of vegetation with peat-forming capability in these areas may be possible, it is expected that the timeframe for such vegetation to develop would be longer than 30 years and that significant resources would also be required.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	BNM (2025) Cloonboley Bog Complex Ecotope Survey Report 2024. Report prepared by the Bord na Móna Ecology Team. Crushell, P., Crowley, W., Vanmechelen, A., Kirwan, B. & Foss, P.J. (2022) County Tipperary Wetlands Survey. Mapping Project and Field Survey 2022. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P. (2023) County Tipperary Wetlands Field Survey II 2023. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Delaney, E., Gallagher, M. C., O'Sullivan, J. Smith, G. F. & Vanmechelen, A. (2024) Ecotope Mapping within a sub-set of designated raised bogs. A report to the National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J., Overy, P. & Foss, P. (2024) County Tipperary Wetlands Field Survey III 2024. Report prepared for Tipperary County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J., Overy, P. & Foss, P. (2024d) County Leitrim Wetlands Field Survey III 2024. Report prepared for Leitrim County Council. Crushell, P., Gallagher, M.C. and Foss, P. (2021) Title: County Leitrim Wetlands Field Survey 2021. Report prepared for Leitrim County Council. Derwin, J. & MacGowan, F. (2000) Raised Bog Restoration Project: A Continuation of the Investigation into the Conservation and Restoration of Selected Raised Bog Sites in Ireland. Unpublished report, Dúchas the Heritage Service, Dublin.

Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-5. Unpublished report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Fernandez, F., MacGowan, F., Crowley, W., Farrell, M., Croal, Y., Fanning, M. & McKee, M. (2006) Assessment of the impacts of turf cutting on designated Raised Bogs 2003-06. Unpublished report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

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Hammond, R.F. (1979) *The Peatlands of Ireland*. An Foras Talúntais, Dublin.

Kelly, L. (1993) Hydrology, Hydrochemistry and Vegetation of Two Raised Bogs in Co. Offaly, Ph.D. Thesis, University of Dublin, Trinity College, Dublin.

Kelly, L. & Schouten, M.G.C. (2002) Vegetation. In: M. G. C. Schouten (Ed.), *Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies*. pp.110-169, Department of Environment and Local Government, Dublin, Ireland/ Staatabosbeheer, The Netherlands.

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. *Irish Wildlife Manuals*, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Moore, P.D. & Bellamy, D.J. (1974) *Peatlands*. Elek Science, London. 221pp.

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NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments, Volume 2. Version 1.0. Unpublished report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.

	NPWS (2014) *Review of Raised Bog Natural Heritage Area Network.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Dublin. NPWS (2015) *National Peatlands Strategy 2015*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Dublin. NPWS (2017) *National Raised Bog Special Areas of Conservation Management Plan 2017-2022.* National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. Perrin, P. (2018) Irish Vegetation Classification: Technical Progress Report No. 3. Report submitted to National Biodiversity Data Centre. http://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/ Schouten, M.G.C. (1984) Some Aspects of the Geographical Gradient in Irish Ombrotrophic Bogs. Proceedings of the Seventh International Peat Congress, Dublin 1, 414-432. Smith, G.F. & Crowley, W. (2020) The habitats of cutover raised bog. *Irish Wildlife Manuals*, No. 128. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. White, J. & Doyle, G. (1982) The vegetation of Ireland: a catalogue raisonné. *J. Life Sci.,* 3, 289-368.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***22,200 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*

4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	*0%*
	b) Estimated Maximum	*0%*
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2001-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	*0%*
	b) Maximum	*0%*
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 0.0 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	

	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ ***Model-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Expert opinion*	
	☐ ***Other*** *(elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	***22,200 km²***	
4.14 Additional information *Optional*	The FRR has remained unchanged since 2019 (NPWS, 2019) when a FRR of 0.0 km^2 was estimated considering that the national target for the area of ARB requires all DRB in the country to be restored to ARB in order for the habitat to achieve favourable conservation status. There have been no recorded habitat losses resulting in a loss of range within the current reporting period (2019-2024). Range was deemed to have remained stable in the last three reporting periods (NPWS, 2008, 2013 and 2019). As a result, Range is also given a *stable* trend in the long (2001-2024) and short (2013-2024) terms.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2019-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***25 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method*	

	e) yes, but nature of change is unknown *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): ***a) genuine change*** *b) improved knowledge or more accurate data* *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / **increasing** / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate** / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2001-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing / decreasing / uncertain / **unknown***	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) 0.0 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ <u>Model-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">20 km²</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">DRB is defined using an eco-hydrological model in Ireland and as there has been no new modelling work undertaken during the current reporting period, no change in the extent of DRB can be accurately estimated. NPWS (2019) estimated the minimum national extent of DRB as approximately 25 km^2.

Regarding the Favourable Reference Area (FRA) for the related habitat, ARB requires that all DRB within the country (25 km^2) is restored to ARB. Thus, the FRA of DRB is 0.0 km^2. More specifically, NPWS (2017, 2019) indicates that all DRB within the proposed new network of designated sites (17.65 km^2) has to be converted to ARB in order for both ARB and DRB to achieve favourable conservation status within the network of designated sites.

An accurate assessment of changes in DRB extent within the current reporting would require a comparison of modelled data from two widely separated dates within the reporting period for a representative selection of sites. No eco-hydrological modelling was</td></tr>
</table>

	undertaken during the current reporting period so a revised estimate of DRB cannot be undertaken. However, as the conservation status of DRB is intimately linked with that of ARB, the national conservation status assessment of Area for DRB is *Unfavourable-Bad*. The trend is assessed by estimating the losses and gains that have occurred in extent of the habitat. Losses of DRB could occur for two main reasons: 1. Increases in ARB (from DRB), which is a positive trend 2. Losses of DRB due to losses of supporting habitat to turf cutting, which is a negative trend. Both scenarios are likely to have occurred during the reporting period so a decreasing trend in the extent of DRB is estimated in the reporting period. Whether that trend is due mainly to positive or negative factors is unknown but considering that a 7% increase in ARB is reported, the likelihood is that most of the losses reflect a positive trend. Thus, although the extent is estimated to be decreasing, it is reported as increasing to reflect the positive trend. Note that small increases in DRB may have occurred on some sites where there were losses in ARB. Considering that the 2,500 ha estimate of DRB given in 2018 was a minimum estimate, and that the losses of DRB since then are believed to have been small (e.g. maximum loss of DRB to ARB estimated to be in the region of 130 ha), the overall minimum national extent of DRB is still estimated to be approximately 2,500 ha. Even smaller (unquantified) net losses of DRB were also reported by Fernandez & Eakin (in prep.) for the 2013-18 reporting period. In the short term, an unquantified decreasing trend in the extent of DRB is estimated. However, as the decrease represents a positive trend, the trend is reported as *increasing*. NPWS (2017) estimated an increase of 3.29 km^2 of DRB from 1994 to 2012/13. Thus**,** the long-term trend in the extent of DRB is unknown. The current habitat area (25 km^2) is significantly above the FRA (0.0 km^2). For DRB a habitat area that is more than 15% above the FRA is considered to be *Unfavourable-Bad.* A network of sites has been designated across Ireland to aid the conservation management of the two habitats listed in Annex I of the EU Habitats Directive that are associated exclusively with raised bogs: the priority habitat Active Raised Bogs (ARB, 7110) and Degraded Raised Bogs still capable of natural regeneration (DRB, 7120). These two habitats are intimately linked, with the conservation goal being to turn all DRB into ARB. Fifty-five sites have been designated as Special Areas of Conservation (SACs) for ARB and an additional seven sites designated for DRB. In addition, Ireland's Natural Heritage Area (NHA) network for raised bogs currently consists of 75 sites. A review of the NHA network was undertaken in 2014, with 36 sites (including seven partially) proposed for retention as NHAs, 46 (including seven partially) proposed for de-designation and 25 new sites proposed for designation. Following legislative changes, this review will be updated and concluded, and the network reconfigured accordingly. The extent of DRB in Ireland when the Directive came into force in 1994 was estimated by the NPWS (2017) as being 17.95 km^2. This was

	composed of 6.50 km^2 of DRB within the 53 original raised bog SACs, 5.20 km^2 within the original network of 75 NHAs and 6.25 km^2 within non-designated sites. Considering NPWS (2019) subsequently re-assessed further sites (not assessed by NPWS, 2017) as likely containing DRB in 2018, updating the 2018 estimate of DRB in the country from 21.24 km^2 (NPWS, 2017) to 25.0 km^2 (NPWS, 2019) in the process, it is likely that the extent of DRB present in 1994 was also underestimated by the NPWS (2017) and so an estimate of 20.0 km^2 of DRB present in 1994 is given.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0 km²***
		Maximum	***0 km²***
	b) Area in not-good condition	**Minimum**	***25 km²***
		Maximum	***25 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / **increasing** / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*			
6.8 Additional information *Optional*	The habitat's conservation condition assessments (site level) undertaken within the current reporting period have been based directly on the results of ARB assessment. This is due to the absence of topographical data (LiDAR), and thus modelled output, within two		

	discrete dates in the reporting period as well as more specific data (e.g. relevés), which did not enable accurate assessments of DRB Area / Structure and functions changes. The condition of DRB is very often related to the condition of ARB. Site-specific conservation objectives (SSCOs) developed by NPWS for all raised bog SACs (https://www.npws.ie/protected-sites) recognise this inter-dependency between the three main raised bog habitats (7110, 7120 and 7150): "Based on the close ecological relationship between these three habitat types, it is not necessary to set conservation objectives for all three habitats individually. It is considered that, should favourable conservation condition for ARB be achieved, then favourable conservation condition for the other two habitats will also be achieved" (NPWS, 2017). Based on the above and due to the absence of modelled DRB figures within two separate dates in the reporting period, the DRB Structure and functions assessment has been based directly on the results of the ARB Structure and functions assessment. Thus, the Structure and functions assessment of DRB is the same as for ARB, which is *Unfavourable-Bad/increasing*. NPWS (2019) based this condition assessment on the actual definition of the habitat (i.e. capable of being restored to ARB). Thus, it was assumed that DRB Structure and functions are not in good condition at any of the sites, as the main objective is to restore the habitat to ARB. Therefore, all 25 km² of estimated DRB area are deemed to be in not-good condition.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Whole >90%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Medium
PK04 Atmospheric N-deposition	Ongoing and likely to be in the future	Whole >90%	Medium
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low

PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PH08 Other human intrusions and disturbance not mentioned above	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	The spread of *Rhododendron ponticum* and conifers such as *Picea sitchensis* and *Pinus contorta* is a minor issue on a small number of sites. In general, on raised bogs, *Rhododendron* tends to be more of a problem on cutovers than on high bog and thus is more likely to impact on peat-forming habitats on the cutover than on ARB or DRB on the high bog. *Sarracenia purpurea* is also reported from the high bog on a small number of sites.
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Air Pollution Information System (APIS) https://www.apis.ac.uk/app. Bord na Móna Peatlands. https://www.bordnamona.ie/peatlands/overview/. Bord na Móna The Peatlands Climate Action Scheme (PCAS). https://www.bnmpcas.ie/. Coll, J., Bourke, D., Gormally, M., Sheehy Skeffington, M. & Sweeney, John (2013) Winners and Losers: Climate Change Impacts on Biodiversity in Ireland. Project Report. Environmental Protection Agency. Crushell, P., Crowley, W., Delaney, E., Denyer, J., Fernandez, F., Foss, P., Gallagher, M.C., O'Sullivan, J., Overy, P., Smith, G. F. & Vanmechelen, A. (2025) Active and Degraded raised bog conservation status assessment for the 2019-2024 period. *Irish Wildlife Manuals*, No. 1XX. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. DAFM (2024) Land Types for Afforestation: Soil and Fertility, Department of Agriculture, Food and the Marine, Johnstown Castle Estate, Wexford. Desmond, M., O'Brien, P. & McGovern, F. (2017) A Summary of the State of Knowledge of Climate Change Impacts for Ireland. CCRP Report No. 223. Environmental Protection Agency, Johnstown Castle, Ireland. Donnelly, A., Caffarra, A., Albanito, F. & Jones, M. (2008) The impact of climate change on semi-natural ecosystems in Ireland (Chapter 5). In *Climate change in Ireland: Refining the impacts*, Edited

	by: Sweeney, J. 132–159. Dublin: Environmental Protection Agency. Fernandez, F. & Eakin, M. (in prep.) Active raised bog, Degraded raised bog and Depressions on peat substrates of the Rhynchosporion conservation status assessment. *Irish Wildlife Manuals,* No. 1XX. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Jones, M.B., Donnelly, A. & Albanito, F. (2006) Responses of Irish vegetation to future climate change. *Biology and Environment: Proceedings of the Royal Irish Academy,* 106B(3), 323–334. Kelleghan D.B., Hayes, E.T., Everard, M. & Curran, T.P (2019) Mapping ammonia risk on sensitive habitats in Ireland. *Science of the Total Environment,* 649, 1580–89. Kelleghan D.B., Hayes, E.T., Everard, M. & Curran, T.P (2020) Assessment of the impact of ammonia emissions from intensive agriculture on special areas of conservation and special protection areas. EPA Research Report No. 347. Wexford, Ireland. Kelleghan, D. B., Hayes, E.T., Everard, M., Keating, P., Lesniak-Podsiadlo, A. & Curran, T.P. (2021) Atmospheric ammonia and nitrogen deposition on Irish Natura 2000 sites: Implications for Irish agriculture. *Atmospheric Environment,* 261, 118611 NPWS (2017) National Raised Bog Special Areas of Conservation Management Plan 2017-2022. National Parks and Wildlife Services, Department of Culture, Heritage and the Gaeltacht. Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
7.4 Additional information *Optional*	PC05 Peat extraction (includes drainage associated with peat extraction): Although peat cutting continues both within the SAC and NHA network and on non-designated sites in 2024, the amount and the intensity of the cutting has decreased within the SAC network. In 2024, 16 of the 62 raised bog SACs (26%) were cut, with an estimated total of 185 plots cut across these 16 sites. This is down 39% from the estimated 308 plots cut across 22 SACs at the end of the last reporting period in 2018. The average number of plots cut during the current reporting period per year across the SAC network was 264.2, which is a 15.5% decrease from the average of 312.8 cut per year during the last reporting period. The average number of SACs cut per year has also decreased, this time by the higher amount of 35.5% from an average of 25.3 sites per year in the last reporting period to 16.3 during the current reporting period. Cutting within the NHA network was assessed using aerial photos (mainly Bluesky and World Imagery from 2020-22). The assessment looked at cutting within the current NHA network as well as the proposed new network and the results indicated the following: – 50 of the 75 current NHAs were cut at some point over the reporting period. Of the 50 sites cut, five were classed as having a very low intensity of cutting, ten as a low intensity, ten as a moderate intensity, eleven as a high intensity and fourteen as a

	very high intensity. All 35 of the sites with a cutting intensity classed as moderate or higher are proposed to be de-designated. – 12 of the 25 NHAs proposed for designation were cut at some point over the reporting period (note than in some cases only one plot was cut within the site). The cutting intensity on seven of the 12 was very low (≤5 plots) with only four sites classed as having a moderate to high amount of active cutting over the reporting period. – Within the proposed new network of NHAs (i.e. those proposed for retention and those newly proposed) turf cutting was recorded on 22 of the 61 sites. The cutting intensity on 13 of the 22 was very low, on five was low, on two was moderate and on two was high over the reporting period. The aerial photo assessment suggests that, while there is limited cutting within the proposed new NHA network, cutting (and associated drainage) in the current NHA network is widespread. No analysis was made of cutting on non-designated sites. Where turf cutting continues, the drainage associated with it is included within this pressure. Where turf cutting has ceased, but the drainage associated with the activity remains, this drainage is reported under the more general pressure, PL02 Drainage. Very little new drainage (associated with turf cutting) was inserted into any of the raised bogs that are designated as SAC or the NHAs proposed for retention during the reporting period, the exception being the continuation of cutover drains in towards the facebank where cutting is continuing. However, drainage was inserted during the reporting period on some of the NHAs that are proposed for de-designation as well as non-designated sites. During the current reporting period, turf cutting (or associated drainage) was reported from 18 of the 46 bogs (39%) for which a conservation condition assessment was undertaken. PL02 Drainage: In previous reporting periods, all drainage, whether associated with turf cutting or not, was reported under this heading. However, for this reporting period, the drainage reported on under PL02 relates to drainage not associated with turf cutting or to drainage that may have been associated with turf cutting in the past, but where no cutting took place during the reporting period. During the current reporting period, of the 46 bogs where a conservation condition assessment was undertaken, general drainage was reported from all the sites where turf cutting and associated drainage was not reported. PK04 Atmospheric Nitrogen Deposition: Agriculture is the dominant source of these emissions (Kelleghan *et al*., 2019, 2021) and arguably this pressure could be reported under PA20 Livestock farming generating pollution, but more research is needed. A study of five raised bog SAC sites by Kelleghan *et al*. (2021) found that all five sites exceeded the higher band of the critical load range (10 kg N/ha/year) with rates of 10.1–17.32 kg N/ha/year. Kelleghan *et al*. (2019, 2020) have also modelled over 90% of Ireland's raised bog SACs as being above Critical Levels for atmospheric ammonia.

	PB, including PB24 Drainage for forestry and PB01 Afforestation: Conifer plantations (totalling 428.9 ha) across 22 SACs and 22 NHAs have been identified as being necessary to remove in order for sites to achieve favourable conservation status. All conifer plantations have associated drainage, and this can continue to impact ARB and DRB after conifers are removed. Furthermore, the drainage associated with conifer plantations can make restoration difficult as, unless enhanced measures are undertaken, the ridge and furrow modification of the surface remains as a legacy giving drier-loving non-bog plants and conifers and birch a niche to re-colonise. Once these begin to grow, they contribute to lowering the water table in the area once again. Enhanced measures can be used to combat this. During the current reporting period, plantations were reported as an impact on 19 of the 46 bogs (41%) for which a conservation condition assessment was undertaken. PA22 Drainage for Agriculture: During the current reporting period, drainage (both pre-existing and new) for use as agricultural land was reported as potentially impacting on DRB from 15 of the 46 bogs (33%) assessed with an imperceptible impact on Annex I habitats estimated on three of the 15 bogs, a low impact estimated on three, a medium impact on seven and a high impact on two bogs. Note that it can be difficult to estimate the impact of this activity, and further investigations are necessary to refine the assessment. Drainage works for agriculture took place within 11 of the 15 bogs during the reporting period. PJ Climate change (includes PJ01 Temperature Changes and PJ03 Changes in precipitation regimes): Donnelly *et al.* (2008) identified raised bogs as one of Ireland's habitats that is most vulnerable to the impacts of climate change. Longer and drier summers are expected to promote an increased decomposition of peatlands and the Suitable Climatic Area (SCA) of the habitat in Ireland is predicted to decline by 32% by 2055 and by 38% by 2075. Coll *et al.* (2013) project a marked contraction of the SCA around the Central Plain, with substantial losses and fragmentation at the southern edge of the distribution. They also indicate that the current protected network will need to adapt to these changes, and they state that restoration will improve the extent, integrity and resilience of the habitat. On the whole, Desmond *et al*. (2017) recognises that the potential impact of climate change on Ireland's peatlands remains highly uncertain, derived from the combined uncertainty in the projections for climate change itself, including the uncertainty in predictions for changing levels of precipitation, and the lack of knowledge on the current vulnerability of much of Ireland's peatlands. Although the pressure from climate change is expected to increase, an increase in resilience to the negative effects of climate change is expected through the implementation of site-specific restoration plans at bogs within SACs and NHAs proposed for retention. PH08 Other human intrusions and disturbance (Burning): All burning that impacts ARB or DRB is reported under this category. However, the cause of the fire is not always known. On the 46 bogs assessed during the reporting period, the impacts of fire were recorded on six (13.0%). A total of c. 170 ha of high bog vegetation was burned across

	four bogs during the reporting period, with a further 15 ha across two bogs burned in the year or two immediately prior to the reporting period. Other impacting activities on DRB which have been reported as occurring less commonly include PI02 Other invasive species, PI01 Problematic native species, PA01 Conversion into agricultural land (excluding drainage and burning) and PE01 Roads, paths, railroads and related infrastructure (and associated drainage).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MC02 Adapt/manage exploitation of energy resources MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure MK03 Restoration of habitats impacted by multi-purpose hydrological changes MB14 Manage drainage and water abstraction for forestry (conifer plantation removal and restoration of drained areas) MI03 Management, control or eradication of other invasive alien species MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MA14 Other measures related to agricultural practices
8.7 Additional information *Optional*	MC02 Adapt/manage exploitation of energy resources: This includes actions such as the designation of a site as an SAC or NHA (and subsequent development of site-specific restoration plans and drainage management plans), the NPWS compensation schemes, wider engagement by NPWS and preparatory actions (in advance of restoration works) such as refinement of original restoration plans, development of best-practice restoration methodologies, stakeholder engagement and the signing of landowner agreements. All of these, as well as the growing environmental awareness of landowners, has led to a decrease in the extent of turf cutting, and an increase in readiness to implement restoration works. The NPWS and the Department of Housing, Local Government and Heritage has committed significant resources to eliminating the impacts from turf cutting activity within designated sites, particularly SACs and the NHAs that are proposed for retention within the current network. This includes the application of the Cessation of Turf Cutting Compensation Scheme (CTCCS) to the NHAs proposed for retention and implementation of a turf cutting relocation programme. These measures have reduced turf-cutting trends within SACs and the NHAs that are proposed for retention. Overall, across the designated network, turf cutting has decreased as a result of the control of turf cutting by 35.5% (on a site basis) from an average of 25.3 SACs cut/year in the last reporting period (2013-2018) to 16.3 cut/year in the current reporting period (2019-2024). The same detailed analysis is not available for the NHAs proposed for retention, but analysis of aerial photos suggests that turf cutting decreased from 21 cut in the 2013-18 period to 13 cut post-2018 (38.1% decrease). The average number of plots cut during the current reporting period per year across the SAC network was 264.2, which is a 15.5% decrease from the average of 312.8 cut per year during the last reporting period. This marked downward trend in turf cutting activity is not visible in the

	NHAs proposed for designation or the NHAs proposed to be de-designated. Neither is there clear evidence to suggest a downward trend across non-designated sites. However, one clear positive change across non-designated bogs is the decision of Bord na Móna to cease turf cutting, with the company's last full peat harvest taking place in 2018, followed by a partial harvest in 2019 and a full suspension of harvesting operations in 2020. Following on from this, further positive change is anticipated as a result of works undertaken by the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS), a large-scale project, running from 2021-26, aimed at rehabilitating and restoring previously harvested peatlands. Further positive change is also anticipated as a result of the recent work undertaken by the Environmental Protection Agency (EPA) in halting commercial peat harvesting operations. With a view to the management of the SACs and NHAs, site-specific restoration plans have been developed for all 62 raised bog SACs and the 36 NHAs proposed for retention. These detailed plans identify the drains that need to be blocked as well as any other measures such as bunding that may be needed for the site to achieve favourable conservation status. The plans are currently being implemented by the NPWS, with works undertaken on 31 designated sites (23 SACs and 9 NHAs) from 2018 to 2024 under the national raised bog restoration programme and the EU LIFE project The Living Bog. MC07 Habitat restoration/creation from resources, exploitation areas (drain blocking): This is included as a conservation measure where drains associated with turf cutting activities (past or present) have been blocked as part of restoration works. It also includes any drains along (turf-cutting) access tracks that were blocked. Such actions proposed under the national raised bog restoration programme continue to be rolled out by the NPWS. The restoration plans drawn up for each bog within a designated site, estimates the lengths of drains proposed to be blocked within each bog. An estimated 3,617 km of drains need to be blocked in total across SACs and NHAs proposed for retention. An estimated 1,566 km (43%) of these drains had been blocked by November 2024, with 525 km (34%) of those drains blocked within the reporting period. Within the SACs, 942 km (39%) of drains proposed to be blocked had been blocked by November 2024, with 343 km (36%) of those drains blocked within the reporting period. Within the NHAs proposed for retention, 624 km (51%) of drains proposed to be blocked had been blocked by November 2024, with 183 km (29%) of drains blocked within the reporting period. In total, drains were blocked within 40% of SACs (22 sites) and 25% of NHAs proposed for retention (nine sites) during the reporting period. MK03 Restoration of habitats impacted by multi-purpose hydrological changes (enhanced restoration measures): Actions proposed under the NPWS national raised bog restoration programme include enhanced restoration measures such as trench bunding and contour bunding. The restoration plans drawn up for each bog within a designated site estimate the lengths of bunds proposed to be built as part of the restoration works to be undertaken within each bog. Across SACs and NHAs proposed for retention, 110 km (37%) of bunds

	proposed to be built had been built by November 2024, with 99% of these bunds constructed within the reporting period. Within the SACs, 72 km (34%) of bunds proposed to be built had been built by November 2024. Within the NHAs proposed for retention, 38 km (48%) of bunds proposed to be built had been built. During the reporting period, bunds were constructed in 14 of the 29 SACs (48%) and 6 of the 18 NHAs (33%) where they have been proposed. The success of bunds built on sites such as Cloncrow Bog NHA has led to a reappraisal of the methods, and further opportunities for bund construction other than what was initially proposed as part of the first phase of the restoration plans is being explored on a site-by-site basis as restoration works are undertaken. MB14 Manage drainage and water abstraction for forestry (conifer plantation removal and restoration of drained areas): Actions proposed under the NPWS national raised bog restoration programme include the targeted removal of specific conifer plantations, the blocking of associated drains and restoration of the associated peatland area. In previous reporting periods, conifer removal and the blocking of associated drains was carried out by Coillte during two separate LIFE projects: LIFE04 NAT/IE/000121, which ran from 2004 to 2008 and undertook works on 14 SACs and LIFE09 NAT/IE/000222, which ran from 2011 to 2015 and undertook works on five SACs and 12 NHAs. The total extent of land within both projects was 1,256 ha: high bog (737 ha) and cutover (519 ha). An assessment of the second LIFE project results highlighted by Fernandez & Eakin (in prep.) indicated that 49 ha of ARB were expected to improve in quality and expand as a result of the restoration works implemented and that these gains are expected to occur not only within the project areas but also within high bog sections adjacent to them. Plantations (totalling 428.9 ha) across 22 SACs and 22 NHAs were identified as being necessary to remove in order for sites to achieve favourable conservation status. Very few conifer plantations were removed during the reporting period, with one small area (0.5 ha) removed on Carrownagappul SAC 001242 as part of The Living Bog works and another (0.3 ha) on Cloncrow Bog NHA 000677 as part of CarePeat. A 4.5 ha plantation on the southern cutover of Scohaboy NHA 000937 was also removed by Coillte in late 2024/early 2025. The slow progress in the removal of conifer plantations may in part be due to legal constraints (e.g. there is an obligation to replant an area within two years of a plantation being felled), which currently exist when undertaking forest–to-bog projects. As mentioned under the pressures/threats section, enhanced restoration measures are usually needed in areas where forestry is removed to combat the ridge/furrow legacy. During the reporting period, the method of stump flipping was trialled on a conifer plantation on one SAC in 2021, and cell bunding was constructed within a former Coillte LIFE area in another SAC in 2024. On a broader scale, peat soils in general have been offered some protection from forestry through the Afforestation Scheme 2023-2027 (DAFM, 2024) as, where there is >30 cm of peat, only native

	forest types will be considered and then only where no new drainage is needed. MI03 Management, control or eradication of other invasive alien species: Actions proposed under the NPWS national raised bog restoration programme include the control/eradication of non-native plants such as *Rhododendron ponticum* and *Sarracenia purpurea* as well as conifers, which may have spread onto high bog from adjacent conifer plantations, such as *Pinus contorta* and *Picea sitchensis*. Invasive species tend not to be a major problem on raised bogs, with the spread of species such as *Rhododendron* generally confined to the cutover. A limited number of invasive species control programmes were undertaken on raised bogs during the reporting period, the most substantial being the control by Coillte of invasives on former Coillte LIFE sites. MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats): Actions proposed under the NPWS national raised bog restoration programme include the targeted blocking or partial blocking of specific agricultural drains that are considered necessary to block in order to achieve favourable conservation status for ARB (and thus DRB). In general, the conservation measures prescribed under this action are, so far, proving the most difficult to implement, with prolonged engagement required to progress the blocking of drains associated with agriculture. Such drains were blocked on two of the 46 bogs assessed as part of the monitoring programme, with works on both bogs undertaken as part of an agri-environmental scheme (FarmPEAT), which was specifically designed to incentivise farmers to raise the water table in their peaty agricultural soils on the margin of the bog. The Climate Action Plan (2024) has a target to reduce the management intensity (which includes raising the water table to within 10 cm of ground level) of at least 80,000 ha of drained, agriculturally managed, carbon-rich soils by 2030. If this target is realised, it is likely to have a positive impact on DRB. Targets outlined in the Nature Restoration Law include EU member states needing to develop national restoration plans by 2026, resulting in the restoration of at least 30% of habitats in poor condition by 2030, 60% by 2040, and 90% by 2050. If these targets are realised, they will likely have a positive impact on DRB. MA14 Other measures related to agricultural practices: Two general agricultural schemes have been launched during the reporting period by DAFM that are likely to have benefits in regard to reducing ammonia deposition and/or increasing the water table adjacent to raised bog sites. These are the Low Emission Slurry Spreading (LESS) Scheme and the Agri-Climate Rural Environment Scheme (ACRES). The LESS scheme launched in 2023 (DAFM, 2025) provides funding for farmers to purchase specialist LESS equipment. The use of such equipment reduces the loss of nitrogen gases into the atmosphere from the practice of spreading slurry. The ACRES scheme (DAFM, 2022) has two measures that should reduce nitrogen deposition on raised bog habitats. The LESS measure within ACRES promotes the practice of low-emission slurry spreading

	amongst participant farmers by issuing a payment to farmers for adopting the measure. ACRES also includes an optional results-based scorecard measure for Low Input Peat Grassland available only to farmers with grasslands on peat soil within 500 m of designated raised bogs. This should incentivise farmers to improve conservation management of these grasslands, a potential result of which is the raising of water tables in areas immediately surrounding designated raised bogs and the reduction of nutrient inputs in grassland in such areas. The capital costs involved in blocking drains etc. may be covered on some western raised bog sites where drain blocking may be funded through Landscape Actions under the ACRES Co-operation approach.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	*Good / Poor / **Bad** / Unknown*
	b) Area	*Good / **Poor** / Bad / Unknown*
	c) Structure and functions	*Good / **Poor** / Bad / Unknown*
9.2 Additional information *Optional*	Four (turf cutting and associated drainage, drainage, burning and forestry) of the seven main pressures/threats are expected to have a decreasing impact due to the implementation of conservation measures, one (ammonia deposition) is expected to stay stable and two (drainage for agriculture and climate change) have an increasing threat. However, there is potential to reverse the increasing threat from agricultural drainage in the next reporting period through a number of measures/plans. For example, one of the targets of the Climate Action Plan 2024 is to reduce the management intensity of at least 80,000 ha of drained, agriculturally managed, carbon-rich soils by 2030. This target includes raising the water table to within 10 cm of ground level. Other schemes/laws that may help combat this pressure include the EU Nature Restoration Law, the Low Input Peat Grassland aspect of ACRES and more general regulations under CAP23 such as GAEC2. Thus, although this pressure/threat is currently recorded as increasing, a decreasing trend in the next reporting period is possible. An increasing trend in the impact of each of the seven conservation measures listed above (MC02, MC07, MK03, MB14, MI02, MA13 and MA14) is expected. Although a decreasing trend in negatively impacting activities and an increasing trend in positively impacting ones can be expected in the future, the conservation status of the Area and Structure and functions of the habitat is expected to remain *Unfavourable-Bad* in the next two reporting periods, as the extent of DRB is expected to remain >15% above the FRV (0 ha) and the Structure and functions (as percent of habitat in good condition) is expected to remain >25% below the FRV. This is due to the continuation of pressures and threats within and outside of the designated sites and practical challenges in implementing the national restoration ambition. Nevertheless, if these issues are addressed, future prospects can be dramatically improved as works continue to be undertaken as part of the national raised bog restoration programme.	

	Overall, a *positive* trend is anticipated in the Area and Structure and functions of the habitat. The positive decreases in extent are expected to continue throughout the next two reporting periods, but the degree of this decrease will depend on, and is subject to, ongoing management and restoration programmes being continued and/or initiated as outlined in section 10.8 below. The Future prospects for Range are reported as being *Bad* as the habitat is under threat in non-designated sites, some of which are the only example of the habitat within a 10x10 km grid cell.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* ***improving** / deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*

10.8 Additional information *Optional*	This Article 17 reporting period has recorded the first increase in the extent of ARB (habitat 7110) since reporting began. This increase in ARB will have come from DRB (habitat 7120) and thus as a consequence the extent of DRB will have decreased. From a conservation perspective this is considered a positive trend. No eco-hydrological modelling work has been undertaken during the reporting period and it is assumed that there have been losses and gains of DRB during the reporting period. The losses can be either positive (where the DRB has been restored to ARB) or negative (where DRB has been lost due to impacting activities such as turf cutting). The gains are generally negative (as they generally occur due to losses in ARB). As no eco-hydrological modelling work was undertaken during the reporting period, an accurate estimate of the current extent of DRB within the SAC network cannot be assessed. However, as there has been a slight increase in the extent of ARB since the last reporting period, a slight decrease in the extent of DRB is also likely. As a result, an increasing trend (to reflect the positive trend of the decrease) is given to DRB within the SAC network in the 2019-2024 period. The actual extent of this change is unknown. Thus, the current extent of DRB within the SAC network is estimated to be in the region of 12.0-12.2 km^2, which is a slight update on the figure of 12.2 km^2 estimated by NPWS (2019). In the short term (2013-2024), the extent of DRB within the SAC network in Ireland is estimated (with some degree of uncertainty) to have remained relatively stable. NPWS (2017) estimated an increase of 3.29 km^2 of DRB from 1994 to 2012/13. Thus, the long-term trend in the extent of DRB is unknown. The future prospects of DRB are difficult to accurately assess without continually updating the eco-hydrological model used to estimate the extent of this habitat. The conservation status (including the future prospects) of DRB is intimately linked with that of ARB. This Article 17 reporting period has recorded the first increase in the extent and structure and functions of ARB since reporting began. This highlights the progress that has been made in the last number of decades in conserving the habitat. Continued progress is expected, with further increases anticipated in the next reporting period due to the roll-out of the national raised bog restoration programme. However, achieving favourable status for ARB (and thus DRB) will not occur in the short term or indeed long term unless further measures are implemented. These include: – the designation (and management) of the proposed new network of sites (2 SACs & 25 NHAs). – the discontinuation of negatively impacting activities – the development/establishment of projects aimed at incentivising the restoration/rehabilitation of cutovers in and adjacent to raised bogs – the development of protocols/management procedures aimed at reducing nitrogen emissions from agriculture, particularly in areas adjacent to raised bogs – the further development of appropriate policy on forest-to-bog projects on deep-peat soils

	– the full implementation of the national raised bog restoration programme.

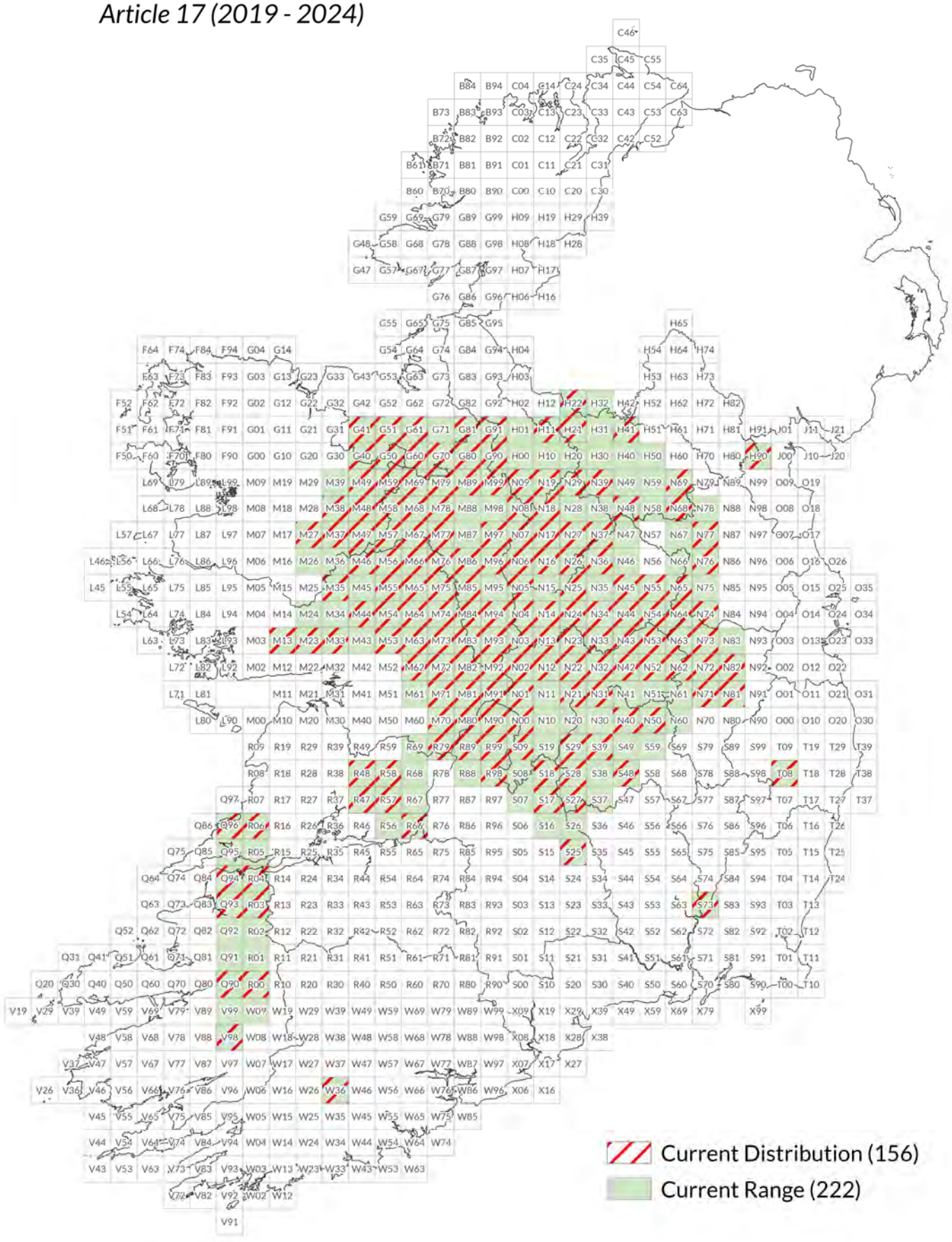
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	***12.0 km²***
	b) Maximum	***12.2 km²***
	c) Best single value	
11.2 Type of estimate	*Best estimate / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The estimate of 12.0-12.2 km^2 of DRB within Natura 2000 sites is a slight update on the figure of 12.2 km^2 estimated by NPWS (2019). No eco-hydrological modelling work has been undertaken during the reporting period and it is assumed that there have been losses and gains of DRB during the reporting period. The losses can be either positive (where the DRB has been restored to ARB) or negative (where	

	DRB has been lost due to impacting activities such as turf cutting). The gains are generally negative (as they generally occur due to losses in ARB). As no eco-hydrological modelling work was undertaken during the reporting period, an accurate estimate of the current extent of DRB within the SAC network cannot be assessed. However, as there has been a slight increase in the extent of ARB since the last reporting period, a slight decrease in the extent of DRB is also likely. The extensive restoration works undertaken within the SAC network during the reporting period are anticipated to result in significant decreases in the extent of DRB (as a result of increases in ARB, a positive trend) within the network by the time of the next reporting period.

12 Complementary information *N/A*

Degraded raised bogs (7120)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7130 Blanket bogs (* if active bog)**
1.2i Habitat short name	**Blanket bog (active)***
1.3i Habitat description	Blanket bog is a climatic climax ecosystem occurring extensively in Ireland's uplands and western lowlands (where mean annual rainfall exceeds 1,250 mm) and on slopes up to c. 25° in hyperoceanic areas. It occurs on peat thickness of generally >50 cm (up to c. 4 m on uplands and on lowlands to 8 m). In comparison, raised bog thicknesses usually exceed 8 m but can be up to 15 m). The floristic composition of blanket bog vegetation and its structure (macromorphology and surface morphology) change considerably, from east to west and lowland to upland, due mainly to differences in annual rainfall amount, rainfall mineral/nutrient content; air humidity and mean annual temperature (Schouten, 1984). Blanket bog often occurs in a complex ecohydrological relationship with heaths, transition mire, fen and freshwater habitats. Areas of active and non-active 7130 habitat qualify as Annex I habitat and the former has priority status under the Habitats Directive, and is defined as supporting "significant areas of vegetation that are normally peat-forming". Non-active blanket bog is an Annex I habitat and is defined based on likely rate of recovery of peat-forming vegetation. Blanket bog may support communities with affinities to the *Oxycocco-Ericion tetralicis*, *Ericion tetralicis* and *Scheuchzerion palustris* associations (Perrin, 2024). All Irish Vegetation Classification (IVC) communities of the *Rhynchospora alba – Sphagnum cuspidatum* (BG1) and *Erica tetralix – Sphagnum capillifolium* (BG2) bog groups can occur in the habitat (Perrin, 2024). Plant communities and microtopography of blanket bog can be very variable, with quality lowland examples typically supporting a significant cover of *Schoenus nigricans* and *Molinia caerulea*, with *Eriophorum angustifolium* and *Erica tetralix;* and *Calluna vulgaris* on hummocks. Hummocks of *Sphagnum rubellum* and *S. papillosum* are typical and *Racomitrium lanuginosum* may top hummocks. *S. subnitens, S. austinii* and *S. beothuk* occur locally. Lawns have *S. papillosum*, *S. medium*, *S. tenellum*, *Campylopus atrovirens, C. brevipilus* and *Pleurozia purpurea*. Bog pools support *Sphagnum denticulatum*, *S. cuspidatum* and *Drosera anglica* and locally *D. intermedia, Utricularia* spp., *Eriocaulon aquaticum* and *Lobelia dortmanna*. *Pinguicula vulgaris, P. grandiflora* (in the south-west) and *P. lusitanica* may also occur. Additional vascular plant species typical of lowland blanket bog are *Potentilla erecta, Carex panicea, Pedicularis sylvatica, Narthecium ossifragum, Rhynchospora alba (*see also habitat 7150*),* and *Menyanthes trifoliata*. Upland blanket bog can have considerable dwarf shrub cover of *Calluna vulgaris, Empetrum nigrum* and *Vaccinium myrtillus*, and in the sward, *Trichophorum germanicum* and *Eriophorum vaginatum*. In wet, intact upland bog, a well-developed bryophyte layer occurs, with

	Sphagnum capillifolium often dominant, alongside S*. papillosum, Hypnum cupressiforme, Racomitrium lanuginosum* and *Diplophyllum albicans*. Lichens of the *Cladonia* genus, particularly *C. uncialis* and *C. portentosa*, are a characteristic feature of both upland and lowland blanket bog. Pool systems can also occur on upland bogs though actively eroding peat hagg and gully complexes occur on many mountain summit bogs largely thought to have been initiated by human activities (particularly fires) in historic times. Regarding what qualifies as Annex I habitat 7130 blanket bog (active and non-active), the approach to date of the National Survey of Upland Habitats (NSUH) has been to discount areas of eroding bare peat, unvegetated areas of milled or cutover bog, and afforested blanket peat (Perrin *et al.*, 2014c). Areas of eroded bog recolonised by swards of *Eriophorum angustifolium* were defined as 7130 inactive ('non-active' is now the preferred term). The NSUH classified habitats on the basis of existing vegetation, which means that some areas of degraded blanket bog that now support heath vegetation are classified as 4010 Wet heath, 4030 Dry heath or 4060 Alpine and subalpine heath. The assessment presented here is for the combined NSUH types, active and inactive blanket bog, as historically these have not been differentiated in habitat mapping, although recent research and surveys are attempting to better define and distinguish active and non-active types.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1949-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 7130 or Fossitt code PB2 or PB3 (Fossitt, 2000), a relevant NPWS or Irish Vegetation Classification (IVC) habitat code or the National Land Cover (NLC) class 'Blanket Bog' and the 'Cutover Bog' class when these occurred over blanket peats. Sources added to the distribution map this reporting period are: five National Survey of Upland Habitats (NSUH) sites (Rigoni *et al*. 2023; Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), Barron & Mackin (2022), Crowley *et al.,* (2023), Foss *et al*., (2021), Hodd (2023), Martin *et al.,* (2023), O'Neill *et al.* (2021), Scott Cawley (2021), Lydon

	& Smith (2023), the National Fen Survey 2021 to 2023 dataset (Brophy *et al.,* in prep.), NPWS Farm Plans (2019-2023) and the BirdWatch Ireland CABB habitat surveys. In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: 15 NSUH sites (Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012), Barron (2017), Barron & Daly (2015), Coillte Biodiversity Dataset (various dates), Crushell *et al*., (2015), Douglas *et al*., (1990), Foss *et al*., (2014, 2015), Galway County Council (2017), Hodd (2016), Hodd & Barron (2015), Madden & Conaghan (2001), Martin (2016), Moran & Wilson-Parr (2015), O'Neill & Martin (2018), Perrin (2024) which comprises data ranging from 1949 to 2014, Tubridy *et al.,* (2015), Anon (1998, 2005), Barron & Perrin (2010, 2011), Ballycroy, Connemara and Glenveagh National Park Habitat Maps, Crushell & Foss (2008), Crushell & O'Callaghan (2008), Hickey & Tubridy (2009), Murphy & Fernandez (2009), NPWS (2013b), NPWS Habitat Assignment Project, Wilson (2009) and Wilson & Foss (2011). GIS files from the Carlow Pilot Habitat Mapping Project (Carlow County Council), the Cavan Wetland Survey (Cavan County Council), Dún Laoghaire Rathdown habitat survey (Dún Laoghaire Rathdown County Council), the Mayo Local Area Surveys (Mayo County Council) and the Uplands and Peatlands Grazing Survey (NPWS). All references are detailed below in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are based primarily on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. Certainty values from the datasets utilised during the last reporting period were not reassigned for the purposes of the distribution map. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron S.J. & Mackin F. (2022) Fiddandarry Bog, Co. Sligo Monitoring Report. Unpublished report for Birdwatch Ireland by BEC Consultants and RPS Ireland.

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4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***54,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 54,800 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ approximately equal to the favourable reference range (less than 2% smaller) ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.	
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of 7130 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Short-term trend for Range was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). There was no loss of range caused by the recorded losses of area during these two reporting periods. The short-term trend in Range is judged to be *stable*. Due to improved knowledge from additional survey sources in the current reporting period, there is an increase of 77 10x10 km grid cells between the previous reporting period (471 cells) and the current reporting period (548 cells). These changes are primarily due to the	

	inclusion of the National Land Cover (NLC) polygons (Lydon & Smith, 2023) for this reporting period, although this is not derived from field survey and requires further validation. The Favourable Reference Range (FRR) is based on the premise used in NPWS (2007) that the current estimate of Range is the FRR, as there has been no decline since the Directive came into force in 1994, and no enlargement of range is deemed necessary to ensure the long-term survival of the habitat. The FRR is therefore the current range, reported in section 4.1. FRR has been increased since the last reporting period (NPWS, 2019) to reflect the improved level of knowledge rather than an actual increase in range.

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***1949-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3,768.11 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	

5.7 Short-term trend Direction	*stable / increasing / **decreasing** / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/**pre-defined range***	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing / **decreasing** / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2">Unknown</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 1949 when bog and heath relevés were recorded by Braun-Blanquet and Tüxen (data utilised in Perrin, 2024) and incorporates updates made by surveys up until 2023. A full list of these resources is presented in section 3.4.

Area was calculated from the polygon shapefile and point shapefile used for distribution. Each point record located more than 500 m from a polygon had 100 ha of habitat applied to it. This is a conservative estimate based on the logic that 7130 habitat can cover substantial areas.

The reported surface area of 7130 has increased from 2,574.51 km² in NPWS (2019) to 3,768.11 km² in this reporting period, largely due to the inclusion of data from the National Land Cover map (NLC) (Lydon & Smith, 2023).

Section 5.3 was amended from ‘minimum’ in NPWS (2019) to ‘best estimate’ for this reporting period. This change is due to the inclusion of the NLC polygons (Lydon & Smith, 2023) in this reporting period. NLC polygons were derived from remote sensing and machine learning. The accuracy of NLC in identifying blanket bog and cutover bog is 77% and 62% respectively, according to the F1 Score (%) presented in Lydon & Smith (2023), though this validation is based on aerial photograph interpretation and has not been field-verified, so</td></tr>
</table>

errors may be present. Despite these reservations, the distribution map now has national coverage for this habitat.

The current area loss assessment uses data from the National Survey of Upland Habitats (NSUH), local observations, as well as wind farm and landslide datasets.

Of the datasets used to map the 7130 distributions, loss of area was only fully assessed during NSUH surveys. Twenty-one NSUH datasets were used in the Area assessment (Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b; Rigoni *et al.* 2023, Perrin *et al.* 2014a, 2014b, 2011, 2012, 2013a-e; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012). Twenty out of the twenty-one NSUH sites are within SACs, so losses within these sites are not fully representative of the losses occurring outside of the SAC network, where losses would be expected to be larger. These twenty-one datasets represent 9.03% of the total area of 7130 habitat.

To estimate other losses, particularly those occurring outside the SAC network, two other national datasets were used. The methodology used to extract losses from these national datasets is presented below. The default trend periods used are those presented in sections 5.6 and 5.11.

A wind farm point location shapefile from SEAI's Wind Atlas dated June 2022 was sourced (https://data.gov.ie/dataset/wind-farms-in-ireland). This dataset was used to estimate area loss by comparing the locations of wind farms to the 7130 blanket bog polygon and point distribution shapefiles.

Wind farm points that overlapped or were within 50 m of a mapped 7130 feature had an estimated area loss of 1 ha applied. The 'Year of construction' field in the wind farm dataset was used to determine the time period the loss occurred in. This analysis derived a conservative estimate of 27 ha of 7130 habitat loss due to wind farm developments since 2013 (51.9% of the potential loss occurred in this reporting period), and 56 ha of loss from wind farm developments since 2000. These figures are considered minimum losses from this activity.

A Geological Survey Ireland (GSI) landslide extent dataset was sourced (GSI, 2024). This dataset mapped boundaries of recorded landslides. It was intersected with the 7130 polygon and point distribution shapefiles to determine the area of potential loss. The 'Year' field in the landslide dataset was used to determine the timing of the event. This analysis indicated 5.5 ha of potential loss from landslides between 2013 and 2020 (25.0% of the loss occurred in this reporting period), and 12.6 ha of potential loss since 2000. While not all landslide events will result in permanent loss of the 7130 habitat (especially if residual peat remains), some events will leave only the subsoil or rocky substrate remaining, rendering it unsuitable for blanket bog recolonisation. A further 405 ha of landslides events, for which no 'Year' was assigned to the event, intersected the 7130 dataset and therefore these data could not be used in the analyses. Considering the unassigned 405 ha of landslides within 7130 (some of which may represent permanent loss within the relevant time periods), the 5.5 ha and 12.6 ha of potential loss derived from the above analyses were

	considered actual loss for the purpose of determining trend. These figures are considered minimum losses from this activity. Short-term trend direction for Area was determined to be *decreasing*. Since 2013, approximately 18.03 ha of 7130 habitat within four NSUH sites were determined to have been lost. Activities to which these losses were attributed are peat cutting, afforestation, scrub encroachment, paths and tracks and erosion due to recreational activities (Barron *et al.* 2022a, 2022b; Hodd *et al*. 2022a; Rigoni *et al*. 2023). Additionally, spatial analyses and information from NPWS staff indicate losses of 34.58 ha, through windfarms (27 ha), landslides (5.5 ha) and track and road creation (2 ha), since 2013. Based on the figures available, the total recorded area of 7130 habitat lost since 2013 is approximately 52.61 ha. The actual area of 7130 lost since 2013 is likely to be higher, as many additional losses are known, but either the area impacted or the date of the loss is not known, so they could not be factored into the calculations. Within the current reporting period there have been negative impacts due to activities which include, but are not limited to, All Terrain Vehicles, landslides and erosion, exacerbated by overgrazing and burning. The area impacted and the timing of the losses were not indicated but are likely to have been ongoing over multiple time periods. The NSUH datasets indicated small gains in area at one of the 21 NSUH sites since 2000 but none within the current reporting period. During the last reporting period, there was a 0.36 ha increase in 7130 within Slieve Mish Mountains SAC (002185) (Perrin *et al*. 2014a) due to revegetated tracks and recolonised bare/disturbed peat. However, these gains were not enough to counteract losses either at this site or nationally. The magnitude of the known loss was calculated as -0.0012% per annum, measured over a period of 12 years. Although the magnitude of known loss is <1% per annum, actual losses of 7130 are likely to be higher, as detailed above. Long-term trend direction for Area was determined to be *decreasing*. Since 2000, approximately 53.84 ha of 7130 habitat within 17 of the 21 NSUH sites were lost. Spatial analyses assigned 56 ha of 7130 habitat loss from wind farms since 2000, and 12.6 ha of loss from landslides since 2000. In addition to the 2 ha of loss reported locally since 2013, the total derived area of 7130 habitat lost since 2000 is approximately 124.44 ha. It is difficult to estimate area loss due to turf cutting, but 7130 habitat has been lost in the past to this activity and there is continued activity, as well as localised expansion on uncut areas. The turbary GIS review of Compass Informatics (in prep.) estimates that, across the 55 blanket SACs, 7,130.49 ha (Cat. 1) were already 'seriously' impacted prior to 1995 and remain 'seriously' impacted due to continued activity within these areas. An estimated additional 6,337.94 (Cat. 2) were already 'partially' impacted prior to 1995 and remain 'partially' impacted. An estimated 179.94 ha (84.18 ha (Cat 3A) plus 95.76 ha (Cat 6)) of blanket bog are reported as 'seriously' impacted between 2012 and c. 2022 through expansion of turf-cutting to uncut areas, while 63.62 ha have been 'partially' impacted through such expansion in this period. These

	impacts are likely to have resulted in either loss or degradation of the condition of 7130 habitat which makes it difficult to ascribe to Area or Structure and functions. The information is provided to demonstrate that further losses have occurred. Area losses due to turf cutting outside of SACs is currently not known. An estimated 204.58 ha (Cat 7) of 7130 habitat were identified as already being 'partially' impacted by turf cutting by 1995 but revegetated by 2023 (176.27 ha of this was reported as revegetated by 2012). As prior to revegetation these areas had been 'partially', rather than 'seriously' impacted, it is likely that they still qualified as a mix of active or non-active bog. These may qualify as gains, however it is not clear whether they are gains in area or improvements in habitat quality. NFI (2022) reported that 310,597 ha is planted on peats. The Department of Agriculture, Food and the Marine highlighted that afforestation of unenclosed land (predominantly made up of peat type soils) peaked in 1995 with over 6000 ha planted per annum, but since 2006 there has been a steep decline, with 265 ha of unenclosed land planted in 2011, and approximately 100 ha of unenclosed land planted in 2013 (NPWS, 2015; Renou-Wilson & Byrne, 2015). However, the 7130 habitat can also occur on enclosed lands. Farrell & Renou-Wilson (2008) reported that in 2006, a total of 8,012 ha of new plantations were established nationally; 2,323 ha (29%) of this were on peat soils, mainly on blanket peatland. Data released under Access to Information on the Environment (AIE) indicated that in 2015, approximately 5,300 ha of forestry were approved for planting on peat soils (Sargent, 2020). However, the latter figure cannot reliably be used to determine area loss of bog/heath due to afforestation, as extensive areas of peat soils (c. 339,300 ha) are also under grasslands (Duffy *et al*. 2023). There has been a move away from new planting on deeper peats; however, outside of protected sites, areas of blanket bog may still be incurring afforestation – perhaps not on the deepest blanket bogs, but blanket bog can occur on peats of 50cm. In summary, there is evidence of loss from a limited number of sites, however there is likely much greater loss from other factors that are not as easy to quantify. Favourable Reference Area (FRA) is deemed to be more than the current area (though less than 10% more), given that anthropogenic losses have occurred since the Directive came into force. Losses of 7130 habitat outside of SACs are likely to be higher due to lower levels of protection and scrutiny. Analysis of the mapped national distribution of 7130 and the SAC shapefile (SAC_2024_05_Matrix.shp) indicates that 50.5% of 7130 habitat lies outside of the SAC network.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***1575.07 km²***
		Maximum	***1963.19 km²***
	b) Area in not-good condition	**Minimum**	***1804.93 km²***
		Maximum	***2193.04 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	Typical species for 7130 habitat as used in condition assessments in the NSUH (Perrin *et al.*, 2014) are: *Andromeda polifolia, Breutelia chrysocoma, Calluna vulgaris, Carex bigelowii, Diplophyllum albicans, Drosera spp. (count separately), Empetrum nigrum, Erica tetralix, Eriophorum angustifolium, Eriophorum vaginatum, Menyanthes trifoliata, Myrica gale, Narthecium ossifragum,* non-crustose lichens (count separately), *Odontoschisma sphagni, Pedicularis sylvatica, Pinguicula lusitanica, Pleurozia purpurea, Polygala serpyllifolia, Racomitrium lanuginosum, Rhynchospora* spp. (count separately), *Scapania gracilis, Schoenus nigricans, Sphagnum* spp. (count separately, exclude *S. fallax), Trichophorum germanicum* and *Vaccinium myrtillus.*		
6.8 Additional information *Optional*	Perrin *et al*. (2014c) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to		

	pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. Monitoring stop data for the current reporting period was available from: five SACs from the NSUH, one SAC in the SUAS EIP, monitoring of a blanket bog restoration project, and one SAC in EU LIFE IP Wild Atlantic Nature (WAN). A total of 63 monitoring stops were recorded in 7130 habitat across the five NSUH sites surveyed in this reporting period. Of the 63 stops, 39 (61.9%) failed either one or more of the criteria assessing the vegetation composition, vegetation structure and physical structure of the habitat. Data for 25 monitoring stops recorded in 7130 habitat as part of the SUAS EIP (2018-2022) were collated. Of these 25 stops, 20 (80%) failed either one or more of the assessment criteria. Data from one EU LIFE IP WAN project site was made available for the current assessment. Surveys of one EU LIFE IP WAN project site were conducted in 2023/24 with 391 stops recorded in 7130 habitat. These data indicate 214 (54.7%) failed either one or more of the criteria. Assessment data from monitoring of 7130 habitat at a restoration site were also available. A total of 26plot assessments were undertaken, of which 21 (80.8%) failed the assessment on one or more criteria. As these stops were part of restoration monitoring, they were positioned in areas of impacted habitat, so the failure rate is higher than would be expected had they been randomly placed. Combining the data gives a total of 505 monitoring stops. Of these, 211 stops (41.8%) passed the Structure and functions assessment on all criteria and 294 stops (58.2%) failed on one or more criteria. When these percentages are applied to the national area of 7130 habitat (3,768.11 km²), 1,575.07 km^2 is in good condition and 2193.04 km^2 is in 'not-good' condition. As these data are based on a limited dataset with a relatively poor national distribution, data from the last reporting period were also utilised. During the previous reporting period, 52.1% of the 7130 habitat was assessed as in good condition and 47.9% as in not-good condition (NPWS, 2019). These same percentages were applied to the current area of 7130 habitat to derive the maximum area in good condition (1,963.19 km²) and minimum area in not-good condition (1,804.93 km²). The minimum area in good condition and maximum area in not-good condition are based on data from the current reporting period. The short-term trend period is considered to be *stable*. During the previous reporting period (NPWS, 2019), 52.1% of the 7130 habitat was in good condition and in this reporting period 41.8% is assessed as in good condition. While this could be interpreted as a *declining* trend, direct comparison between the datasets is not possible. The data available from both monitoring periods have been collected on an ad hoc basis rather than repeated assessments from a national monitoring network, and they are both based on a limited dataset with a poor national distribution. The *stable* assessment is based on expert opinion.

	When the 505 stops from the current reporting period are reviewed, the most frequent criteria to fail the Structure and functions assessment were 'percentage of area showing signs of drainage in local vicinity' (19.6%), 'cover of erosion gullies and eroded areas within the greater bog mosaic' (17.6%), 'cover of disturbed bare ground' (16.2%) and 'cover of bryophyte or lichen species' (14.1%). The most frequent criteria to fail the Structure and functions assessment in the last reporting period were 'no signs of burning into moss/lichen layer or exposure of bare peat due to burning', 'no signs of burning in sensitive areas', 'areas showing signs of drainage' and 'cover of erosion gullies and eroded areas within the greater bog mosaic' (NPWS, 2019). Due to the limited coverage of the assessment plots these failures may reflect site-specific issues rather than the national trend. Five additional assessment criteria for 7130 habitat were added by Rigoni *et al.* (2023). Assessments of 'cover of lichen species' and 'total cover of *Sphagnum* species' were added to the vegetation structure criteria and assessments of 'acrotelm thickness' and 'microtopographic variation: cover of hummocks, hollows, lawns and pools' both in the relevé and in the local vicinity, were added to the physical structure criteria. However, no thresholds were set for these criteria, so they were not used in the assessments by that or other surveys. As with the Area assessment, the majority of the data utilised for the Structure and functions assessment were from SACs. The area of 7130 habitat in good condition outside of SACs is likely to be significantly less due to lower levels of protection and scrutiny.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Majority 50-90%	High
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	High
PA18 Agricultural activities generating air pollution	Ongoing and likely to be in the future	Whole >90%	High
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	High
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	High
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Medium
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Medium

PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Medium
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PB26 Other forestry activities, excluding those relating to agro-forestry	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R02685 *Campylopus introflexus;* R11544 *Picea sitchensis;* R18691 *Pinus contorta* subsp*. contorta;* R12976 *Rhododendron ponticum* R03227 *Cervus nippon;* R04810 *Dama dama;* R06611 *Gaultheria mucronata*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
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7.4 Additional information

Optional

Pressures and threats presented in 7.1 were selected and ranked based on intensity (high, medium, low), frequency of occurrence, and area of impact where data were available.

PC05 'Peat extraction' is considered to be a high-influence pressure and threat, with cutting of turf, both by hand and by mechanical means, ongoing in this habitat across its range, both inside and outside of the SAC network. A 2024 review of available aerial imagery (Compass Informatics, in prep.) estimated that, in the 55 SACs for which 7130 is a Qualifying Interest (QI), a total of 13,468.43 ha of 7130 had already either been 'partially' or 'seriously' impacted by turf cutting prior to 1995. It estimated that between 2012 and 2023 a total area of 243.56 ha of intact bog had incurred new turbary impacts.

PA07 'Intensive grazing or overgrazing by livestock' was identified as a high-influence pressure. Overgrazing can reduce diversity of the 7130 vegetation, cause damage and lead to erosion. During the current reporting period, a negative impact due to overgrazing was recorded from one of the five NSUH sites surveyed in this period. The SUAS EIP (2018-2022) reported sheep overgrazing as a pressure within 7130 habitat. The 2024 WAN habitat survey of one SAC reports intensive grazing as the principal impact on blanket bog, affecting an

	estimated 1,231.4 ha of this SAC. Local observations corroborate that overgrazing continues to be impacting many areas. PA09 'Burning for agriculture' and PH04 'Vandalism or arson (incl. human-introduced wildfire)' were identified as high-influence pressures. These pressures can lead to widespread loss and degradation of upland habitats (Perrin *et al.* 2014c). Unregulated burning can reduce plant species diversity and the ericoid component of the vegetation, as well as often causing significant damage to the bryophyte layer. Burning also contributes to peat erosion, desiccation of the habitat and may encourage the spread of grasses, particularly *Molinia caerulea*, which can become dominant to the exclusion of most other species. Burns that are too frequent or severe can result in habitat loss (Glaves *et al.*, 2013). To analyse the impact of fires on the 7130 habitat, an EFFIS burnt area shapefile for the Republic of Ireland, based on MODIS imagery, was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped 308 large fire events in the Republic of Ireland covering 18,590 ha. The 7130 polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. These indicate that approximately 4,581 ha of 7130 habitat (1.2% of the national 7130 resource) were subject to a large burn event during this reporting period, which is 25% of the total area subject to large burns. Three of the five NSUH sites surveyed this reporting period noted 7130 habitat impacted by recent burns. The SUAS EIP (2018-2022) identified uncontrolled burning as the main activity resulting in the unfavourable condition of many of the commonages and upland farms assessed, with intense, frequent and severe burns leading to poor vegetation structure of 7130 habitat within the sites covered by the project. PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' was recorded as a high-importance pressure in NPWS (2019) based on expert judgement and was retained as a high-influence pressure this reporting period. Afforestation can result in direct habitat loss, as well as fragmentation of the 7130 habitat. NSUH surveys reported loss of 7130 habitat to afforestation at three of the 21 sites surveyed to date. The area of this loss at these sites since 1995 amounts to 35.5 ha. A selection of forestry licence appeal cases were analysed by Sargent (2020), with this review highlighting that licences had been granted for planting or felling in peatlands, or close to these sensitive areas, during the current reporting period. The 2022 National Survey of breeding Hen Harrier noted afforestation as one of the main factors responsible for the loss of Hen Harrier foraging and nesting habitats, which include blanket bog (Ruddock *et al.*, 2024). The associated impact PB26 'Other forestry activities, excluding those relating to agro-forestry', in the form of fire breaks, was recorded at one site during the current reporting period, with drainage associated with fire breaks also noted at other sites.

	PA18 'Agricultural activities generating air pollution' was recorded as a high-importance pressure in NPWS (2019) and was retained as high-influence pressure this reporting period. Analyses indicate that plant species in the habitats 7130, 4010 and 4060 are the most sensitive to total nitrogen deposition (Aherne *et al.*, 2021). PD01 'Wind, wave and tidal power (including infrastructure)' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure in this reporting period. Wind farms can result in direct habitat loss (e.g. turbine foundations, vehicle access roads, sub-stations) and degradation of the surrounding 7130 habitat, largely caused by changes in hydrology and associated ecosystem functioning. Available wind farm data (https://data.gov.ie/dataset/wind-farms-in-ireland) are, in general, provided as a single point for each wind farm development. NPWS (2019) analysis assigned a 2 km buffer to each wind farm point, with this buffer considered representative of the spread of an average upland wind farm development. This 2 km buffer was applied to the wind farm dataset (dated June 2022) with locations of wind farms assessed in relation to the mapped 7130 distribution. A buffer of 1 km was also applied to take account of smaller developments. This review highlighted that 61.0% of all wind farms are within 2 km of 7130 habitat, with 52.4% of wind farms within 1 km. A second analysis was conducted to assess wind farms constructed within this reporting period (2019-2022), 68.3% of new wind farms are within 2 km of 7130 habitat, with 65.9% within 1 km. These analyses indicate that wind farm locations are, and continue to be, strongly associated with the distribution of 7130 habitat, with likely impacts including landslides, of which further details are included below. During this reporting period a major landslide occurred during road construction at a windfarm resulting in area loss and structural and functional impacts on blanket bog (Dykes, 2022). PM07 'Natural processes without direct or indirect influence from human activities or climate change' was recorded as a medium-importance pressure in NPWS (2019) and was retained as a medium-influence pressure in this reporting period. This impact (i.e. erosion) was recorded within this reporting period by the SUAS EIP (2018-2022), as a widespread impact across all four commonage areas within the project containing 7130. Peatlands are prone to erosion where levels of grazing or trampling by sheep and other grazers are excessive, or where burning has occurred. PL02 Drainage is retained as a medium pressure from previous reporting periods. It was recorded as a high-intensity impact at all five NSUH sites surveyed in the current reporting period. It is typically a result of turf cutting, forestry activities and agricultural reclamation and has a major detrimental impact on the hydrology of the wider bog. The SUAS EIP (2018-2022) noted ongoing drainage impacts at all four of the project sites containing 7130 habitat, due to past turf cutting. A review of aerial imagery in 2023/24 (Compass Informatics, in prep.) identified 382.57 ha of potential blanket bog impacted by drainage from causes other than turf cutting within blanket bog SACs. PM05 'Avalanches, landslides and collapse of terrain', PF05 'Sports, tourism and leisure activities' (e.g. all-terrain vehicle use, walking),

	PI02 'Other invasive alien species (other than species of Union concern)' and PE01 'Roads, paths, railroads and related infrastructure' were all recorded as low impacts in the previous reporting period, but may be more appropriately regarded as medium impacts, as although their impact to 7130 habitat is often localised, it is often severe and leads to a loss of habitat area. Landslides and terrain collapse (PM05) appear to be becoming more frequent (Dykes, 2022). PM05 can have multiple contributory factors including extreme weather events, direct human impacts, as well as legacy land-use effects that have left alterations in the physical, structural and ecohydrological functioning of blanket bog ecosystems. The SUAS EIP reported loss of habitat through landslides at all four commonages in the project that contain 7130 habitat. Other notable landslides this reporting period include: a major landslide at Meenbog in 2020 during wind farm road construction; a major landslide in 2020 on Shass Mountain within the Boleybrack Mountain SAC (002032) that directly impacted 15 ha of 7130 habitat; and a major landslide event in 2020 on Mount Eagle in Co. Kerry that impacted a blanket bog NHA. A detailed study on the possible contributory factors of these three major landslide events were commissioned by NPWS and GSI. PF05 was reported as an impact at all five NSUH sites surveyed in this reporting period. It is most frequently an impact in the form of damage from quad bikes and other all-terrain vehicles. The SUAS EIP (2018-2022) reports this as an impact on 7130 habitat at two sites. It is also an impact in the form of damage due to trampling by hillwalkers (Earthy Matters, 2019). PI02 was recorded as a medium impact at all five sites surveyed by the NSUH in the current reporting period. It was also recorded in 7130 at a range of other locations across the country during the current reporting period, including by the SUAS EIP. This impact is mainly due to the presence of *Rhododendron ponticum*, non-native deer and self-seeded conifers from adjacent commercial plantations. For example, approximately 97.8 ha of 7130 habitat was recorded as impacted by *Rhododendron ponticum*, in some cases severely, in the Dunlewey area of Co. Donegal (Greentrack Environmental Consultants, 2024). The SUAS EIP reported prolifically regenerating Sitka Spruce within one of the target commonages and widespread grazing by non-native deer species across all target commonages within which 7130 occurs. PE01 was also reported as an impact on 7130 habitat at various locations across the country, including at four of the five NSUH sites surveyed in the current reporting period. Low-influence pressures featuring in NPWS (2019) that were also recorded as pressures on 7130 habitat during the current reporting period comprise: PA25 'Agriculture activities not referred to above' (e.g. agricultural intensification–removal of semi-natural vegetation, reseeding and fertilisation for pasture) and PA08 'Extensive grazing or undergrazing by livestock' (specifically undergrazing). These were retained as low-influence pressures for this reporting period. Low-influence pressures only recorded in the current reporting period comprise PA10 'Livestock farming (without grazing)' (i.e.

	supplementary feeding) and PB26 'Other forestry activities, excluding those relating to agro-forestry' (i.e. firebreaks). Low-importance pressures only recorded in NPWS (2019) comprise PK05 'Mixed source soil pollution and solid waste (excluding discharges)' and PK03 'Mixed source air pollution, air-borne pollutants'. These were retained as low-influence pressures for this reporting period. Climate change, mainly as PJ01 'Temperature changes and extremes due to climate change' and PJ03 'Changes in precipitation regimes due to climate change', is assessed as a low-influence pressure but is considered to be a medium-influence threat to 7130. Renou-Wilson & Wilson (2018) indicate areas will be impacted by climate-induced disturbances, 'including (1) gradual changes (in temperature; in the amount, intensity and seasonal distribution of precipitation) and (2) extreme events (severe drought; increased wildfires; flooding events)'. Areas in unfavourable condition will be more susceptible to the impacts of climate change. Concerns relating to prospective seasonal changes include increases in winter rainfall leading to enhanced erosion. An increased risk of severe fire events is likely in areas where drought periods increase as a result of climate change. Intense fires can burn away shallow peat soil or expose peat to erosive elements such as extreme rainfall events. Invasive non-native species may also pose a greater risk to 7130 habitat if their growth conditions are more favoured by changes in climate. Species such as *Rhododendron ponticum* as well as conifers *Pinus contorta* (Lodgepole Pine) and *Picea sitchensis* (Sitka Spruce) could conceivably increase their spread on 7130 habitat with temperature rises and/or where more frequent or prolonged drought periods increase habitat desiccation. Intense summer heat causing desiccation and cracking of the surface peat, followed by subsequent intense rainfall events may be expected to increase the risk of peat landslides (Dykes, 2008, 2022). The thirteen high and medium influence pressures reported in section 7.1 are considered to be the main threats to the 7130 habitat in the future, along with climate change.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or Structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the Structure and functions, including the status of typical species (related to 'Specific Structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) MC02 Adapt/manage exploitation of energy resources

	MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MK01 Reduce impact of mixed source pollution MK03 Restoration of habitats impacted by multi-purpose hydrological changes MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Conservation measures were collated using data from NPWS including relevant NSUH surveys (Rigoni *et al.* 2023; Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b); EU INTERREG VA projects (CABB and CANN 2017 -2022); EU LIFE IP project (WAN 2021-2029); EU EIP-AGRI projects FORUM Connemara; the North Connemara Locally Led EIP Agri-Environmental Scheme, SUAS EIP scheme, MacGillycuddy's Reeks EIP, Inishowen Uplands EIP; EU Horizon 2020 projects; Department of Agriculture, Food and the Marine (DAFM); and Coillte Teo., Ltd. The maintenance of extensive grazing (recorded under MA03) was recorded as a conservation measure four times by the NSUH within the five SACs surveyed during this reporting period as either a neutral or positive impact on 7130 habitat. Within Ireland's National Parks (NPs), Wicklow Mountains NP (NPWS) commenced peatland restoration trials in 2022. At Barnacullian, fencing was erected to exclude grazers (MA06), with heather brash spread to stabilise bare peat (MM01) and lime, fertiliser and grass seeding trialled on unvegetated surfaces (MM01). To assist peatland rewetting and slow run-off water flows, so called 'leaky' dams of timber, stone and sheep's wool were installed (MK03). A larger restoration project, covering 100 ha of drained upland blanket bog at Liffey Head Bog, was undertaken where a network of peat, wood, plastic and coir dams were installed (MC07, MK03). Phase 1 which covered 30 ha was completed in 2023, while Phase 2 on the remaining 60 ha commenced in February 2024. Wicklow NP also work to control alien invasives *Rhododendron ponticum* and Sika Deer (*Cervus nippon*) (MI03). Glenveagh NP works to controls Red Deer (*Cervus elaphus*) numbers and *Rhododendron ponticum* and Prickly Heath (*Gaultheria mucronata*) (MI03). A complete LiDAR survey of Cloghernagore Bog and Glenveagh National Park SAC (002047) was conducted in 2023 to inform a blanket bog conservation measures project. Analysis of the

	LiDAR identified 185 ha of blanket bog as 'high priority' for restoration (NPWS, pers. comm.). Connemara NP undertakes *Rhododendron ponticum* control measures (MI03). The NP has acquired a small herd of Irish Moiled cattle they intend to use for conservation grazing (MA05) in areas where it is appropriate for the control of dense *Molinia caerulea* which may include some drier areas of 7130. The Mweelin Sheep Exclosure Project (MA06) was initiated to allow 24 ha of the NP to recover from unsustainable grazing. The NP website states that "this work may demonstrate the need for this management method across the whole National Park". Killarney NP undertakes *Rhododendron ponticum* control (MI03) and management of MI03 (Sika Deer) and MI05 (Red Deer). Páirc Náisiúnta na Mara, Ciarraí, Ireland's newest National Park, incorporates Mount Brandon Nature Reserve, which has ongoing conservation grazing using cattle within grassland, heath and blanket bog habitats (MA05). The National Parks are typically involved in maintenance of tracks and trails to prevent damage to sensitive habitats (ME01, MF03), work to reduce incidences of illegal dumping (MK01) and illegal fire activity (MA05) and to enforce the Ministerial Direction 2010 on the use of All Terrain and Off-Road Vehicles (MF03). Two EU INTERREG VA projects, Cooperation Across Borders for Biodiversity (CABB 2017-2022) and Collaborative Action for the Natura Network (CANN 2017-2022), conducted within this reporting period, were directly connected to the protection and restoration of Natura 2000 sites (with a significant focus on blanket bog habitat). In 2020, as part of the CABB project, BirdWatch Ireland and NPWS collaborated in the rewetting of 7130 within the state-owned Fiddandarry Bog, which is a 450-ha site within the Ox Mountains Bog SAC (002006). Approximately 35 km of drains were blocked (total of 2089 dams) (MB14). Also, in the CABB project BirdWatch Ireland and NPWS collaborated in fence replacement at the 900 ha state-owned Pettigo Nature Reserve within the Dunragh Loughs/Pettigo Plateau SAC (001125) and instigated a sustainable grazing management plan (MA05). Prior to this, a baseline habitat survey assessed sample areas of the reserve, as a benchmark for evaluating the effects of the new grazing regime. Additionally, habitat mapping and condition assessments were carried out and Conservation Action Plans drafted for four blanket bog SAC to inform conservation measures at these sites. The CANN project undertook restoration actions in Cuilcagh-Anierin Uplands SAC (000584) including drain blocking (MK03), restoring eroded peat (MM01), invasive species control (MI03), the development of a wildfire management strategy (MA05) and track development to reduce impacts on sensitive habitats (MF03). Actions at cross-border blanket bog sites Sliabh Beagh SSSI (Northern Ireland) and Eshbrack Bog NHA (Ireland) included drain blocking (MK03), invasive species control (MI03), wildfire management plans (MA05)

	and conservation grazing by Dexter cattle (MA05). The CANN project also trained local landowners in peatland restoration techniques. EU LIFE IP Wild Atlantic Nature (WAN 2021-2029) works with a range of partners and stakeholders to improve the conservation status of blanket bog and associated habitats across a suite of SACs. Within the WAN project area, there are 35 blanket bog SACs with a total area of 262,632 ha and within this there are 24 action sites. WAN project actions include: peatland habitat mapping and condition assessment, peatland conservation management and restoration, capacity building and improving education/awareness. Central to the project was a pilot Results-Based Payment Scheme (RBPS) conducted in 2021/22 in which more than 820 farmers across 63,000 ha of Natura 2000 and neighbouring lands participated (MA05). Conservation measures in the scheme include: fencing (MA05), invasive species control (MI03), and peatland restoration including drain blocking (MA13, MB14, MC02, MC07, MK03). This RBPS pilot built capacity for the CAP Strategic Plan 2023, and the learnings from the pilot informed the development of the Agri-Climate Rural Environment Scheme including the ACRES Co-operation Project (ACRES CP) (more details below). LIFE IP WAN also coordinates a €15 m Shared Island Initiative project aimed at developing capacity, expertise and sharing knowledge, and delivering peatland restoration. It is a collaboration between NPWS, Northern Ireland Environment Agency (NIEA) and NatureScot. WAN facilitates delivery of training to a wide range of peatland stakeholders. They are involved in demonstrating the restoration of eroded and drained peatlands (MM01, MK03) in Co. Leitrim, and demonstrating forest to bog restoration (MB14) on private lands in Co. Mayo and within Wild Nephin National Park (WAN, 2024). WAN are also developing a home retrofitting and bog restoration pilot to help address turf-cutting in blanket bog SACs by providing homeowners with alternative energy sources. This pilot is looking to demonstrate the deep retrofitting of homes as a way to reduce demand for turf. Simultaneously, participants will agree to restore areas that had been cut for turf in SACs (MC02) and to manage peatland habitats on their farms in an ecologically sustainable manner (WAN, 2024). The WaterLANDS project (2021-2026) is funded through EU Horizon 2020. The Irish action site is Cuilcagh-Anierin Uplands SAC (000584). WaterLANDS and aims to restore over 500 ha of blanket bog habitat in this SAC between September 2024 and March 2025. Conservation measures are coordinated by LIFE IP WAN and include: invasive conifer control (MI03), implementing measures to control erosion (MM01), reprofiling of eroding peat hags, and improving water levels (MK03). WaterLANDS is also monitoring and collating evidence of the effectiveness of its restoration measures (WAN, 2024). The Dúlra Project is primarily involved in the control of the invasive *Rhododendron ponticum* (MI03) in parts of the Twelve Bens/Garraun Complex SAC (002031), the Connemara Bog Complex SAC (002034) and the Mweelrea/Sheeffry/Erriff Complex SAC (001932). The project is a collaboration between FORUM Connemara's Agri-EIP, the North

	Connemara Locally Led Agri-Environmental Scheme EIP and the Leenane Development Association (https://www.dulraproject.com/). Path repair works undertaken as part of the ASCENT project on Errigal, within the Cloghernagore Bog and Glenveagh National Park SAC (002047), reduced the impact of hillwalkers on 7130 habitat (MF03). The Agri-Climate Rural Environment Scheme (ACRES) is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high priority geographical areas are included under ACRES Co-operation (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. The peatland scorecard is the dominant scorecard used for ACRES CP. It is used on 166,541 ha of private land and 394,836 ha of commonage (Muldowney, 2024). Each peatland scorecard has environmental indicators relating to ecological integrity (e.g. number of positive indicators, cover of bryophytes and lichens, grazing levels, etc.), hydrological integrity, and threats and future conservation status prospects (e.g. erosion, bare peat, non-native plants, etc.). Farmers can increase their payments by adjusting management practices (MA05) and/or undertaking Non-Productive Investments (NPIs) or Landscape Actions (LAs). Undertaking NPIs and LAs can increase payment up to €17,500 over the five years of the contract. NPIs differ from Landscape Actions (LAs) in they are generally smaller in scale (e.g. wildlife boxes, bracken control (MI05), tree planting, fencing (MA05), installing gates, scrub removal (MI05)). Rollout of LAs will take place in Q2-Q3 2025. The provisional list of proposed LAs includes a number of landscape actions that could assist in restoring degraded peatlands. These include: invasive species control, virtual fencing, targeted grazing by bovines/goats/equines, ditch/peat reprofiling, erosion control (e.g. using geotextiles) and drain blocking with peat plug/timber dam/coir rolls. The uptake of these LAs and their scale of impact will not be known until the next reporting period. Analyses of the initial ACRES data are underway to determine the impacts of these measures, although quantifiable improvements are likely to take a number of years. Low-emission slurry spreading reduces nitrogen losses to the air and subsequent nitrogen deposition in sensitive habitats. There is currently a Low Emission Slurry Spreading (LESS) Equipment Scheme available to farmers to assist them to buy new slurry-spreading equipment. ACRES also promotes the practice of low-emission slurry spreading amongst participating farmers by issuing a payment to farmers for adopting the measure (MK01). A number of locally led EU European Innovation Partnerships (EIPs) with an upland focus were in operation during this reporting period. Ecologically sustainable grazing was typically a cross-cutting deliverable, with many of these schemes applying results-based scoring. Education, awareness and supporting hill farmers were also key features of these schemes. Relevant EIPs that cover areas containing 7130 habitat comprise:

	- The Sustainable Uplands Agri-environment Scheme (SUAS) EIP (2018-2022) was initiated by the Wicklow Uplands Council. Actions include reduction or cessation of grazing (MA05, MA06), cessation of burning (MA06), invasive species control (MI03) and gully blocking and bare peat stabilisation and revegetation (MM01, MK03). - A Sustainable Agricultural Plan for the MacGillycuddy Reeks - Conservation and restoration of Upland Habitat in the MacGillycuddy's Reeks EIP (2018-2021). Actions: sustainable grazing by cattle and sheep (MA05), invasive species control (MI03), fencing to exclude grazers (MA05), cessation of burning (MA06), management of recreational impacts (MF03) and trail maintenance (MF03). Fourteen land parcels saw improvement in their baseline score, five land parcels remained unchanged, and one land parcel declined by five points. The project report notes "whether it is controlled grazing with sheep and cattle, or the treatment of invasive species such as bracken and rhododendron, several years are required to see measurable changes on the ground". - Locally Led Scheme for the Conservation of the Hen Harrier (2017-2023). This EU EIP scheme targeted lands in six Special Protection Areas (SPAs) designated for breeding Hen Harrier. Actions: conservation grazing with cattle (MA05), controlled grazing (MA05), drain blocking (MK03), invasive species control (MI03), controlled burning – under special circumstances (MA05) and fencing (MA05). - Pearl Mussel Project EIP - Farming for nature in a vibrant rural economy (2018-2023). This project focused on the top eight Freshwater Pearl Mussel catchments. Actions: sustainable grazing (MA05), invasive species control (MI03), drain blocking (MK03) and fencing (MA05). - North Connemara Locally Led Agri-environmental Scheme EIP (2019-2023) operated within the Maumturks and Twelve Bens/Garraun mountain ranges. Actions: fencing (MA05) and invasive species control (MI03). - Comeragh Uplands and Communities EU EIP Project (2021-2022) operated in the Comeragh Mountains, Co. Waterford. Actions: prescribed burning training (MA05). The Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) EFFIS annual reports noted that several landowners had financial penalties imposed under farm payment schemes by DAFM this reporting period, particularly where burning was found to occur outside of the legally permitted period. There were also incidences where farmers were penalised when fires were permitted to burn overnight from February 28th into the illegal period commencing March 1st (MA06). The NPWS Farm Plan Scheme protects key species and habitats through the delivery of site-specific conservation measures at farm level. Polygons containing blanket bog (PB2 and PB3) were extracted from the NPWS Farm Plan shapefile (NPWS_FarmPlans_ 2019_2023.shp). Measures recorded in these polygons included: controlled grazing (MA05, *n*=84 polygons), fencing (MA05, *n*=73),

	conservation grazing with non-native and conservation breeds (MA05, *n*=5) and invasive species control (MI03, *n*=9). A range of measures have been implemented through the NPWS Conservation Measures Programme 2022-2024 that may have a positive impact on 7130 habitat. These include 20 instances of invasive species (primarily Rhododendron) control or mapping (MI04), over an area of at least 9,173 ha, and two instances of deer culling or monitoring (MI05). Erection or repair of fencing to prevent trespass of sheep and deer (MA05, MA06) has been carried out in three instances in areas containing 7130 habitat and wildfire fighting training (MA06) has been funded through the Conservation Measures Program across two upland areas containing significant areas of 7130. Blanket bog restoration actions (MA13) including rewetting of at least 231 ha of 7130 habitat and blocking of 4.5 km of drains. Other measures listed, that may positively impact 7130 habitat, are MF03, MF07 and MM01 (CMP, 2025). Some of these measures are listed elsewhere in this section. NPWS also runs the Peatlands and Natura Community Engagement Scheme (2018-ongoing), which provides funding for local initiatives that enhance awareness and conservation of raised and blanket bogs and other habitats within Natura sites. Coillte are currently increasing the area of their estate managed primarily for nature, from 20% to 30% by 2025. Any remaining open habitat not currently in an existing Coillte 'Biodiversity Area' will be identified by this project and a set of provisional management prescriptions identified (e.g. invasive species control, drain blocking). Poorly developed conifer plantations on peat are also being targeted by this project, with the view to restore these areas to open habitat (MB14). Since 2024, DAFM require all afforestation to be carbon neutral or carbon positive. Afforestation is now stated as only permitted on peat soils with a depth of 30 cm or less. This replaces the former allowance (pre-2024) for afforestation on peat with a depth of 50 cm or less. A new spatial layer is available on INET/IFORIS, with this layer being a composite of the Derived Peatland Map V2, National Landcover Map and Irish Soils Database. It will be assumed for the purpose of afforestation applications that peat soils within these areas are as categorised, unless proven otherwise (MB01) (Accessed from: https://assets.gov.ie/268255/3df078e5-131e-4434-88ee-8a8361ce3330.pdf). This measure is likely to result in a reduction of 7130 habitat impacted, though the Irish NGO Friends of the Irish Environment (FIE) challenged the 30 cm allowance, highlighting that the new guidance failed to take on board the United Nations 2022 advice to protect all peat soils deeper than 10 cm (FIE, 2023).

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in Range is expected based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current area is less than the Favourable Reference Area (<10% below FRA). Conservation status of Area is therefore *Unfavourable-Inadequate*. Future trend of Area is assessed as *negative*, as PC05, PB01, PD01, PM05 and PM07, in combination with several other pressures (e.g. PA07, PA09, PA25, PL02, PI02) are expected to have a negative influence on Area, especially for areas of 7130 habitat outside of Natura sites, even with the conservation measures including MB01, MC02, MC07, MK07, MM01 and MB14 in place. Future prospects of Area are therefore *Poor*. Short-term trend direction is *stable* for habitat that is in good condition. Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A minimum estimate of 47.9% of 7130 habitat is in not-good condition, which equates to *Unfavourable-Bad* Structure and functions. Conservation status of Structure and functions is therefore *Unfavourable-Bad*. NPWS initiated the development of a management and conservation planning framework for designated blanket bog sites in Ireland in 2023. This include the development of National Good Practice Guidelines for the restoration of blanket bogs; an assessment of the restoration potential of conifer plantations within designated sites; the prioritisation of restoration of blanket bog sites on State land within SACs/NHAs and the development of blanket bog SAC level provisional restoration recommendation assessments and implementation restoration action plans (RAPs). SAC level assessments have been developed for four SACs. NPWS have commenced the development of assessments for a suite of additional SACs. Restoration action plans have been developed for > 1000 ha with implementation of works commencing in 2025. RAPs are currently under development for demonstration sites across the WAN network and also in 500 ha of state owned land. This work will be expanded to additional State owned areas in the next few years. Although the current assessment of the Future prospects of Structures and functions is *Unfavourable-Bad* due to the ongoing impact of pressures, the escalation of conservation planning and implementation of measures referred to in section 8 should increase the area and improve the condition and the prospects for blanket bog in future reporting rounds.	

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*

Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
a) No, there is no difference	***a) No, there is no difference***
b) yes, due to genuine change	*b) yes, due to genuine change*
c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
d) yes, due to the use of different method	*d) yes, due to the use of different method*
e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
f) yes, due to other reasons	*f) yes, due to other reasons*

10.8 Additional information

Optional

The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period.

The Conservation Status of Area is *Unfavourable-Inadequate* in this reporting period, as it was in the previous reporting period.

The Conservation Status of the Structure and functions and Future prospects are *Unfavourable-Bad* in this reporting period, as they were in the previous reporting period.

The Overall Conservation Status assessment is *Unfavourable-Bad*, as it was during the last reporting period. The status of *Unfavourable-Bad* during the current reporting period is due to >25% of the area of 7130 habitat being assessed as having *Unfavourable* Structure and functions.

The trend in Overall Conservation Status is assessed as *deteriorating* this reporting period, as it was in the previous reporting period. The *deteriorating* trend is largely due to area losses within the current and previous reporting periods. This has resulted in a *decreasing* short-term trend for Area. Short-term trends for Range and Structure and functions are *stable*.

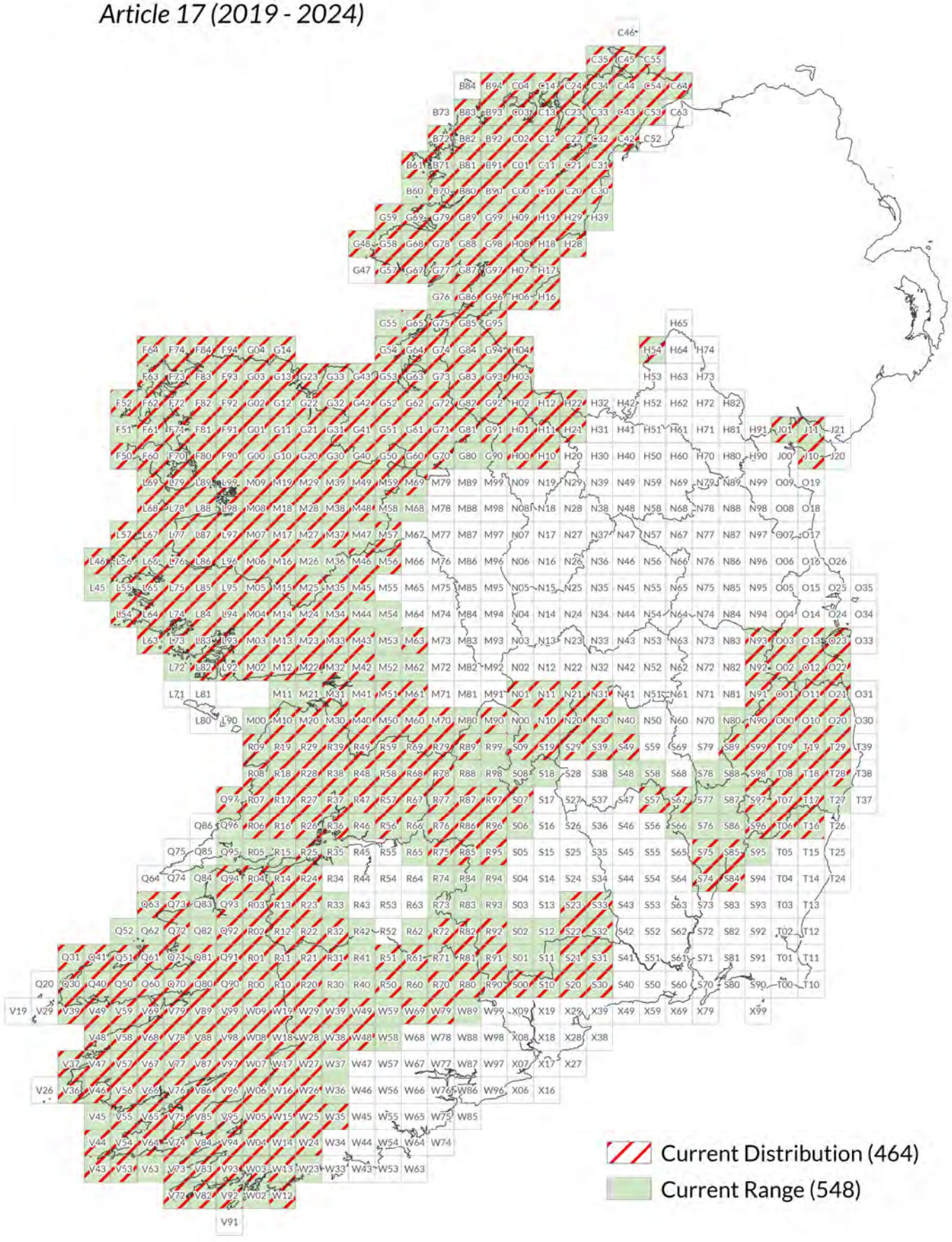
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***1867.06 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 7130 habitat in SACs in the country (49.5% of total national area), including SACs where 7130 is not listed as a Qualifying Interest (QI). The area of 7130 within	

	the SAC network where 7130 is listed as a QI is 1,790.36 km^2 (47.5% of total 7130 area). The short-term trend of the 7130 habitat area within the SAC network is taken to be decreasing, the same trend as the 7130 habitat nationally (section 5.7), as most available data originate from within the SAC network. The short-term trend of the 7130 habitat in good condition within the SAC network is assumed to be stable, the same trend as the 7130 habitat nationally (section 6.4). The reported surface area of 7130 habitat within the SAC network has increased since the last reporting period as a result of improved knowledge lending itself to a refinement of area totals.

12 Complementary information *N/A*

Blanket bog (active)* (7130)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7140 Transition mires and quaking bogs**
1.2i Habitat short name	**Transition mires**
1.3i Habitat description	Transition mires and quaking bogs are peat-forming communities, typically occurring as swards or floating mats over saturated peat or open water. The habitat encompasses a broad range of plant communities that are characteristic of ombrotrophic to soligenous waters. There is often an abundant bryophyte layer. Vegetation ranges from extensive floating mats of small to medium sedges with *Sphagnum*, to localised basic flushes over acid peat with base-tolerant *Sphagnum* and some brown mosses. Aquatic and semi-aquatic vegetation is frequently present. Vegetation communities are often intermediate between acid bog/poor fen and basic rich fen. Transition mires are generally mineral-rich (but not necessarily calcium-rich), with oligotrophic to mesotrophic water with slightly basic to moderately acidic pH. Transition mires may occupy a transitional zone between bog and fen vegetation (such as in the lagg zone of a raised bog), or where groundwater seeps through deep peat (upland soligenous flushes for instance). They can also represent a transitional stage between groundwater-fed fen and rainwater-fed bog, as peat accumulates and isolates the vegetation from groundwater (for instance in lowland topogenous depressions and open water transitions). Transition mires develop in the infilling margins of lakes. They may also be found in damaged habitats, such as flooded peat cuttings over calcareous substrate. The Transition mires and quaking bogs Annex I habitat is widespread, but localised, in Ireland. It has been frequently recorded in blanket bog regions in the north and west, in limestone regions in the north-west and midlands, and in inter-drumlin hollows and lakes in the border counties. The 7140 habitat is comprised of a group of plant communities including FE2B *Carex limosa – Menyanthes trifoliata* mire, FE2C *Carex lasiocarpa – Menyanthes trifoliata* mire, FE2D *Carex rostrata – Menyanthes trifoliata* mire, FE2E *Menyanthes trifoliata – Sphagnum recurvum* agg., FE2F *Menyanthes trifoliata – Calliergonella cuspidata* mire, FE3D *Carex nigra – Calliergonella cuspidata* fen, and FW3C *Carex rostrata* swamp/fen (Perrin, 2024).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2005-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map for the 7140 habitat in Ireland was developed from the polygons included in the 2013-2018 Article 17 distribution file (Galway County Council (2017), Long *et al.*, (2018), Smith & D'Arcy (2020), Crushell *et al*. (2021a; 2021b; 2021c, 2022), Foss *et al*. (2021), O'Neill *et al.* (2021), Barron *et al*. (2022a; 2022b), Hodd *et al*. (2022a; 2022b), NPWS (2022), Crowley *et al.* (2023), Crushell *et al.* (2023), Martin *et al.* (2023), Rigoni *et al*. (2023), Martin *et al*. (in press) and the NPWS National Fen Survey 2021 to 2023 dataset (years 1-3 of National Fen Survey; Brophy *et al*., in prep.). In addition to the sources listed above, the distribution map utilised points digitised from the 2013-2018 Article 17 distribution file (Long *et al.*, 2018) and the NPWS *Vertigo* monitoring survey 2021 to 2024 (Brophy *et al*., 2025). All polygons and points were included unless they were superseded by more recent data, or if a review with remote imagery showed that 7140 habitat was not present. Data sources listed in section 3.4 that recorded the 7140 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g., based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 7140 habitat. Additional relevant data sources gathered during the current reporting period were also reviewed but were not included in the distribution map as there were no 7140 data present. However, these data sources were useful in refining the previous distribution map (NPWS, 2019).

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Barron, S.J., Hodd, R.L. and Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. Barron, S.J., Hodd, R.L. and Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. Brophy, J.T. *et al*. (in prep.) National Fen Survey 2021-2025, *Irish Wildlife Manuals*, No. 1XX, National parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Brophy, J.T., Daly, O.H., Hamilton, J.J., O'Neill, F.H. & Martin, J.R. (2025) Monitoring of three Annex II species of *Vertigo* snail on Irish sites (2022-2024). *Irish Wildlife Manuals*, No. 159, National parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Crowley, W., Vanmechelen, A., O'Sullivan, J. Crushell, P., & Foss, P. (2023) County Mayo Wetlands Field Survey II 2023. Report prepared for Mayo County Council. Crushell, P., Gallagher, M.C. & Foss, P. (2021a) County Leitrim Wetlands Field Survey 2021. Report prepared for Leitrim County Council. Crushell, P., Gallagher, M.C. & Foss, P. (2021b) County Longford Wetlands Field Survey III. 2021. Report prepared for Longford County Council. Crushell, P., Gallagher, M.C., Kirwan, B. & Foss, P. (2021c) County Waterford Wetlands Field Survey 2021. Report prepared for Waterford County Council. Crushell, P., Vanmechelen, A., Crowley, W. & Foss, P.J. (2022) County Cavan Wetlands Survey Mapping Project. Report prepared for Cavan County Council. Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P. J (2023) County Leitrim Wetlands Field Survey II 2023. Report prepared for Leitrim County Council. Foss, P., Gallagher, M.C., Kirwan, B. & Crushell, P. (2021) County Kilkenny Wetlands Field Survey 2021. Report prepared for Kilkenny County Council. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project.

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Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland.

Long, M.P., Crowe, O., Kimberley, S. & Denyer, J. (2018) Backing document – National Conservation Status Assessments (NCAs) for three fen habitat types: 7140 – Transition mires and quaking bogs, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae, 7230 – Alkaline fens. Unpublished report to National Parks and Wildlife Service.

Martin, J.R., O'Neill, F.H. & Daly, O.H. (2023). Floodplain and Callows Grasslands in Ireland. *Irish Wildlife Manuals*, No. 144. National Parks and Wildlife Service, DHLGH, Ireland.

Martin, J.R., O'Neill, F.H., Daly, O.H., Devaney, F. & Woods, K.M.S (in prep.) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats 2021-2023. *Irish Wildlife Manuals*. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

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	mire. https://biodiversityireland.ie/ivc-classification-explorer/fe2/fe2f/. Accessed 10th September 2024. Rigoni, P., Croci, G., Lupieri, G., Naldi, L. & Pintus, L.V. (2023) National Survey of Upland Habitats (Phase 6, 2022), Summary Report No. 1: Slieve Bloom Mountains SAC (000412), Cos. Laois and Offaly. National Parks and Wildlife Service, DHLGH, Dublin. Smith, G.F. & D'Arcy, D. (2020) Desktop survey of wetland sites in County Westmeath. Report prepared for Westmeath County Council. **Other publications consulted for additional information:** Anon. (2022) Explanatory notes in support of the reporting format referred to in Article 17 of Directive 92/43/EEC (Habitats Directive). Final version November 2022. European Commission. Hammond, R. F. (1979) The Peatlands of Ireland. Soil Survey Bulletin No. 35, Teagasc, Dublin. Martin, J.R., O'Neill, F.H. and Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. O'Connell, C. A., Madigan, N., Whyte, T. & Farrell, P. (2021) Peatlands and Climate Change Action Plan 2030. Irish Peatland Conservation Council, Co. Kildare. Ridding, L.E., Watson, S.C.L., Newton, A.C., Rowland, C.S. and Bullock, J.M. (2020) Ongoing, but slowing, habitat loss in a rural landscape over 85 years. *Landscape Ecology*, 35, 257-273.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***48,800 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data***

	c) the use of a different method *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 7140 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The range has changed from 35,100 km² (NPWS, 2019) to 48,800 km² due to more accurate data, with the first national survey for the 7140 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period (Brophy et al., in prep.). This increase in range is due to 7140 habitat being recorded in 96 additional 10x10 km grid cells during the current reporting period. There are seven grid cells where 7140 was previously recorded (NPWS, 2019), but a review of the current data sources (listed in section 3.4) found no evidence for the habitat. It was concluded that 7140 was previously recorded in error within these grid cells, rather than the habitat being lost, as no evidence was found for significant change at each of these seven sites since they were added to the 7140 distribution in 2013.

The Favourable Reference Range (FRR) has been updated since the last reporting period (NPWS, 2019) due to improved knowledge. The NPWS National Fen Survey 2021 to 2023 visited 162 sites where an area of 7140 habitat was mapped. Although there was evidence of a reduction in the area of 7140 habitat at specific sites, due to factors such as conversion into agricultural land and drainage, there was no evidence of a reduction in the range of the habitat.

O'Connell et al. (2021) and their analysis of Hammond (1979) showed that there has been a significant decline in the area of all fen habitats over the 42 years 1979-2020, inclusive. On a county level the data presented in O'Connell et al. (2021) are highly variable, and no</td></tr>
</table>

	evidence is presented for a total loss of fen habitat from any one county. Therefore, although there is evidence of a significant reduction in the area of 7140, there is no evidence from these data of a significant decline in the range (i.e., the loss of 7140 from a county). Based on extrapolation from these data it is concluded that short-term and long-term trend for the Range parameter is *stable*. In order to provide more accurate data for assessing the status of the 7140 range, selected sites should be revisited during the next reporting period, in particular, sites visited during the NPWS National Fen Survey (Brophy *et al*., in prep.). The distribution map presented in section 2 shows that the 7140 habitat is widespread, found in all 26 counties. Based on the available data the current range for the 7140 habitat is thought to encompass the ecological and geographical variation of the habitat and is sufficiently large to ensure its long-term viability. The analysis of Hammond (1979) undertaken by O'Connell *et al.* (2021) shows there has been no significant reduction in the range (i.e., no loss of fen habitat from any one county). These data informed a reference-based approach, with information of moderate quality (i.e., good data on actual distribution and ecological requirements but limited historical distribution data) used to inform the expert opinion that the current range is approximately equal to the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2005-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	**8.50 km²**
	b) Maximum	**41.51 km²**
	c) Best single value	
5.3 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown*	

	f) yes, due to other reasons	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is Unknown***
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*		

<table>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ <u>between 51% and 100% smaller than the FRA</u></td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderat</u>e/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The area of 7140 habitat in Ireland was calculated using the polygons mapped in the 2013-2018 Article 17 distribution file (Galway County Council (2017), Long et al., (2018), Smith & D'Arcy (2020), Crushell et al. (2021a; 2021b; 2021c), Foss et al. (2021), O'Neill et al. (2021), Crushell et al. (2022), Barron et al. (2022a; 2022b), Hodd et al. (2022a; 2022b), NPWS (2022), Crowley et al. (2023), Crushell et al. (2023), Martin et al. (2023), Rigoni et al. (2023), Martin et al. (in press) and the NPWS National Fen Survey 2021 to 2023 dataset (Brophy et al., in prep.). In addition to the sources listed above, the area calculation also utilised points from the 2013-2018 Article 17 shapefile (Long et al., 2018) and the NPWS Vertigo monitoring survey 2021 to 2024 (Brophy et al., 2025). All polygons and points were included unless they were superseded by more recent data, or if a review using remote imagery showed that 7140 habitat was not present.

For the reporting from the 2007-2012 monitoring period (NPWS, 2013), minimum and maximum areas were provided for 7140 habitat. In the subsequent round of monitoring (NPWS, 2019), a best estimate approach was taken, with the best estimate provided being much closer to the maximum area provided in NPWS (2013). Given that the current round of monitoring was the first to include survey data from a national fen survey that provided widespread baseline data, compared to the largely desk-based approach of previous NCAs, it was decided to revert to the minimum-maximum approach. This way, high</td></tr>
</table>

	confidence can be had in the minimum figure, while future surveys can further refine the maximum figure. For Galway County Council (2017), O'Neill *et al.* (2021), Barron *et al*. (2022a; 2022b), Hodd *et al*. (2022a; 2022b), Martin *et al.* (2023), Rigoni *et al*. (2023), Martin *et al*. (in press) and the NPWS National Fen Survey 2021 to 2023 data, the percentage cover of the 7140 habitat within the polygons had been recorded. For all other sources, the percentage cover of the 7140 habitat within polygons was assessed with remote imagery, or a median percentage cover of 10% 7140 per polygon was applied based on the NPWS National Fen Survey 2021 to 2023 data. Following a similar approach to Long *et al*. (2018), a median area of 1,128 m² was calculated from the NPWS National Fen Survey 2021 to 2023 data. For the minimum area, this median area of 1,128 m² was applied to all unique points that had not been superseded by more recent data, except where more precise historical data (e.g. NSUH) were available. For the maximum area, the median value of 1,128 m^2 was only applied to new points. For those points for which older median values were the only data available previously and where more precise historical data (e.g. NUSH data) were available, or where large-scale area estimates were made during previous rounds of monitoring and assigned to a representative point, the previous data were retained. Data sources listed in section 3.4 that recorded the 7140 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g. based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to calculate the area of the 7140 habitat. The significant difference between the habitat extent recorded during the current reporting period and the last (NPWS, 2019) is primarily due to more accurate data, with the first national survey for the 7140 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period (Brophy *et al*., in prep.). The current minimum area of 8.50 km² reported in section 5.2 is significantly smaller than the best estimate area of 77.41 km² reported in NPWS (2019), while the current maximum area of 41.51 km^2 is also less that the NPWS (2019) best estimate area. This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7140 area in the NPWS (2019) area calculation, such as the 3.5 km² Garriskil Bog SAC (000679) and 4.7 km² Mount Hevey Bog (002342) and 2 km² Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7230 overlapped by 32.28 km^2 and the habitat polygons of 7140 and 7210 overlapped by 34.85 km^2. Reviewing these polygons and applying more appropriate estimates

	for the 7140 habitat is a significant cause of the drop in 7140 area from the 2019 best estimate of 77.41 km² to a current maximum estimate of 41.51 km^2. The NPWS National Fen Survey 2021 to 2023 visited 162 sites where an area of 7140 habitat was mapped and this representative dataset was used to investigate area loss. In the absence of baseline mapping with which to compare the current reported extent of the 7140 habitat, remote imagery was used. The earliest available high resolution colour aerial imagery that could be used to assess any loss in 7140 habitat against the NPWS National Fen Survey 2021 to 2023 data was produced in 2000 and 2005, with periodic releases of more up-to-date imagery from 2005 to the present. After comparing the current mapping with the remote imagery, habitat loss was recorded at 14 of the 162 7140 sites plus one site where 7140 was noted as present but the area was too small to map, with six of these losses occurring during the last two reporting periods. At four of the sites the losses were due to infrastructure, such as roads, buildings and wind farms, three were due to afforestation, at two of the sites the loss was due to conversion into agricultural land and at another two the loss was due to scrub encroachment. The remaining losses were due to peat extraction, deposition of rubbish, and drainage, each recorded at one site. Across the 162 7140 sites the total recorded area of 7140 lost due to impacts over the last two reporting periods was 0.6 ha or 0.17% of the total area of 7140 at these 162 sites. Short-term trend in area was deemed to be *decreasing* because the area of 7140 has reduced across six of the surveyed sites during the last two reporting periods due to anthropogenic factors. It should be noted that based on similar surveys of other Annex I habitats in Ireland the methodology of estimating area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin *et al*., 2018). The Favourable Reference Area (FRA) was calculated with reference to O'Connell *et al*. (2021) and their analysis of Hammond (1979) and the reported decline in the area of fen habitats over the last 42 years. These data informed a reference-based approach, with information of moderate quality (i.e., good data on current area/distribution and ecological requirements but limited historical area/distribution data) used to inform expert opinion. On a county level, the data presented in O'Connell *et al*. (2021) is highly variable, with some counties showing an increase in fen habitats, probably due to under-recording in some counties by Hammond (1979), while others have a significant decline. Nationally, O'Connell *et al*. (2021) reported a decline of 78.8% in the area of fen habitat (there was an estimated 92,508 ha fen in 1979, with 19,593 ha remaining in 2021). Assuming that the rate of loss of 1,736 ha per annum ((92,508-19,593)/42 years) has been relatively constant (i.e. a linear relationship) over the last 42 years (Ridding *et al*. (2020) reported that fen, marsh and swamp habitats were the only semi-natural habitats in Dorset to decline linearly between 1930 and 2015), this would mean that the area of fen in 1994, when the EU Habitats Directive came into force in Ireland, was 64,731 ha and 30.3% (19,593 ha) of the fen habitat present in 1994 remained in 2021. This significant decline will have resulted in the loss of fen

	habitat and the fragmentation of what remains. Assuming that the 7140 habitat has had a similar level of decline as fen habitats in general, the current minimum area of 8.50 km² is estimated to be 69.7% (i.e., between 51% and 100%) smaller than the FRA. It is also assumed that the significantly larger area of 7140 present in 1994 represents an FRA that would allow for the favourable conservation status of the habitat. Based on O'Connell *et al*. (2021), the long-term trend for the 7140 area since 1994 is a loss in area at a rate of -2.7% per annum (-69.7%/26 years).

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***5.21 km²***
		Maximum	***25.45 km²***
	b) Area in not-good condition	**Minimum**	***3.29 km²***
		Maximum	***16.06 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		

6.7 Typical species Method used *Optional*	The methodology has changed with assessment criteria for the 7140 habitat developed as part of the NPWS National Fen Survey (Brophy *et al*., in prep.). As part of these criteria the number of positive vascular plant indicator species for an assessment stop to pass the Structure and functions assessment is ≥3 for an infilling pool community and typical *Sphagnum*-rich community and ≥6 for a typical *Sphagnum*-poor community. The list of typical species used for the assessment criteria are: *Angelica sylvestris, Cardamine pratensis, Caltha palustris, Comarum palustre, Carex canescens, Carex demissa. Carex diandra, Carex lasiocarpa, Carex lepidocarpa, Carex limosa, Carex nigra, Carex rostrata, Drosera* spp. (each species is counted separately), *Galium palustre, Epilobium palustre, Equisetum fluviatile, Eriophorum angustifolium, Lysimachia vulgaris, Lythrum salicaria, Mentha aquatica, Menyanthes trifoliata, Phragmites australis, Rhynchospora* spp. (each species is counted separately), *Selaginella selaginoides, Sphagnum* spp. (each species is counted separately), *Succisa pratensis, Viola palustris*. In addition, *Hydrocotyle vulgaris* and *Hypericum elodes* are included as part of the positive indicator species percentage cover score. The list of typical species presented in the last reporting period (NPWS 2019) was a broader list of plant species that are associated with the 7140 habitat.
6.8 Additional information *Optional*	The area of 7140 habitat in good condition was calculated for 147 sites surveyed as part of the NPWS National Fen Survey 2021 to 2023 and O'Neill *et al*. (2021). The number of sites where Structure and functions were assessed was less than the 162 sites surveyed because at 15 sites only small areas of 7140 habitat were recorded. The calculation was based on the percentage of monitoring stops at each site that were assessed to have *Favourable* Structure and functions. As the sample of 147 sites is considered representative of the national resource, the proportion of areas in good and not-good condition were scaled up to estimate the national area. The percentage of the 7140 habitat in good condition has marginally decreased from 63.95% estimated in the last reporting period (NPWS 2019) to 61.32% in the current reporting period. The short-term trend for the habitat is *uncertain* as the dataset used to report the 63.95% habitat in good condition is NPWS (2019) was limited.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	High
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	High

PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PF02 Construction or modification (e.g. of housing and settlements) in existing built-up areas	Ongoing and likely to be in the future	Minority <50%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low
PA02 Conversion from one type of agricultural land use to another (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA21 Active abstraction of water for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Low
PB26 Other forestry activities, excluding those relating to agro-forestry	Ongoing and likely to be in the future	Minority <50%	Low
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Low
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	*Rhododendron* sp. R12332 *Prunus laurocerasus* R01826 *Azolla filiculoides*

	Elodea sp.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures were recorded during field surveys for the NPWS National Fen Survey 2021 to 2023 (Brophy *et al*., in prep.).
7.4 Additional information *Optional*	The NPWS National Fen Survey 2021 to 2023 visited 162 sites where an area of 7140 habitat was mapped and pressures were recorded. The 20 pressures listed in section 7.2a are all negative pressures that were recorded as impacting the 7140 habitat and considered to impact the habitat in the future. The timing presented in section 7b was decided based on if the pressure was currently impacting the habitat and if, based on expert judgement, it would continue to impact in the future. The scope for each pressure (section 7c) was calculated based on the area each pressure impacted as a percentage of the total area of 7140 surveyed. The influence for each pressure was recorded by site and the data presented in section 7.2d is the main influence, that was recorded across the greatest area of 7140 for each pressure. It should be noted that during the National Fen Survey 2021 to 2023 negative pressures were recorded as impacting 62% of the 7140 habitat area. The pressures in the standard list of EU pressures are open to some interpretation; for 17 of the 20 pressures listed in section 7a the description accurately reflects the data recorded, but for three pressures further explanation is needed. PI03 was used by the National Fen Survey to record problematic native species in the form of scrub encroachment. For PA17 the evidence for pollution/nutrient enrichment was often the presence of green slime/algae on plants, substrates or in the water. PI02 was used to record the impact of invasive non-native species such as *Rhododendro*n sp., *Prunus laurocerasus*, *Azolla filiculoides*, and *Elodea* sp. impacting the 7140 habitat.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* *c) **Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*

8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	During the NPWS National Fen Survey 2021 to 2023, conservation measures were recorded in the general site notes or as positive pressures, such as appropriate grazing with stock (conservation measure MA03), or appropriate grazing by wild deer (conservation measure MM01). In addition to site-specific conservation measures, common high-influence negative pressures on the 7140 habitat, such as PA05 'Abandonment of management', PA17 'Agricultural activities generating pollution to surface or ground waters', and PL02

	'Drainage', are sometimes addressed on a broader scale by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g., Carra LIFE), the Department of Agriculture's ACRES agri-environment scheme, or national initiatives such as the Environmental Protection Agency enforcing water quality standards. With 38.7% of the 7140 area surveyed during the current reporting period in 'not-good' condition, there is a need for conservation measures, such as drain blocking, to be applied across a significant area of the habitat. However, based on the data collected during the NPWS National Fen Survey there is little evidence to suggest that conservation measures are being implemented on an appropriate scale to maintain the current area, or structure and functions of the 7140 habitat.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The future trend for the Range parameter is assessed as *stable*, with the negative influence of the reported threats balanced against conservation measures judged to have no significant impact on the overall range of the 7140 habitat over the next 12 years. As the current status of the parameter is *Favourable* and the future trend is assessed as *stable* the Future prospects for Range are *Good*. The future trend of Area is assessed as *negative* based on the negative influence of the reported threats balanced against conservation measures. Only a small loss of area (0.6 ha or 0.17% of the total area mapped by the NPWS National Fen Survey 2021 to 2023) was recorded by Brophy *et al*., (in prep.) between 2021 and 2023, but based on similar surveys of other Annex I habitats in Ireland, the methodology of recording area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin et al., 2018). Therefore, based on expert judgement the current status of the Area parameter is assessed as *Unfavourable-Bad* and together with a *negative* future trend this results in *Bad* Future prospects. The current status of the Structure and functions parameter is assessed as *Unfavourable-Bad*, because <75% of the 7140 area assessed during the current reporting period is in good condition. Based on an assessment of the negative influence of the reported threats balanced against conservation measures the future trend is assessed as *negative* and the Future prospects of Structure and functions are *Bad*.	

<table>
<tr><th colspan="3">10 Conclusions</th></tr>
<tr><td colspan="3">Assessment of conservation status at end of reporting period</td></tr>
<tr><td>10.1 Range</td><td colspan="2"><u>Favourable</u> (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.2 Area</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad</u> (U2) / Unknown (XX)</td></tr>
<tr><td>10.3 Specific structure and functions (incl. typical species)</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad</u> (U2) / Unknown (XX)</td></tr>
<tr><td>10.4 Future prospects</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad</u> (U2) / Unknown (XX)</td></tr>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad</u> (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="10">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td><u>c) yes, due to improved knowledge/more accurate data</u></td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>The change is mainly due to (select only one option):

genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons</td><td>The change is mainly due to (select only one option):

genuine change / <u>improved knowledge or more accurate data</u> / the use of a different method /unknown/ other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">For the parameter of Range the status is assessed as Favourable as the range surface area is not smaller than the Favourable Reference Range and the short-term trend is stable.

For the parameter of Area the status is assessed as Unfavourable-Bad as the current area is more than 10% below the Favourable Reference Area.

The status of Structure and functions is Unfavourable-Bad because ‘more than 25% of the area is unfavourable as regards its specific structure and functions’ (Anon., 2022). The status of Future prospects is also Unfavourable-Bad due to the fact that Structure and functions have Bad Future prospects. As three of the parameters have a status of</td></tr>
</table>

	Unfavourable-Bad, the Overall Conservation status is assessed as *Unfavourable-Bad*. For the parameters Area and Structure and functions, the future trend is assessed as *negative* based on the negative influence of the reported threats balanced against conservation measures. Therefore, the trend in Overall Conservation Status is *Deteriorating* as only the parameter of Range is judged to be *stable*.

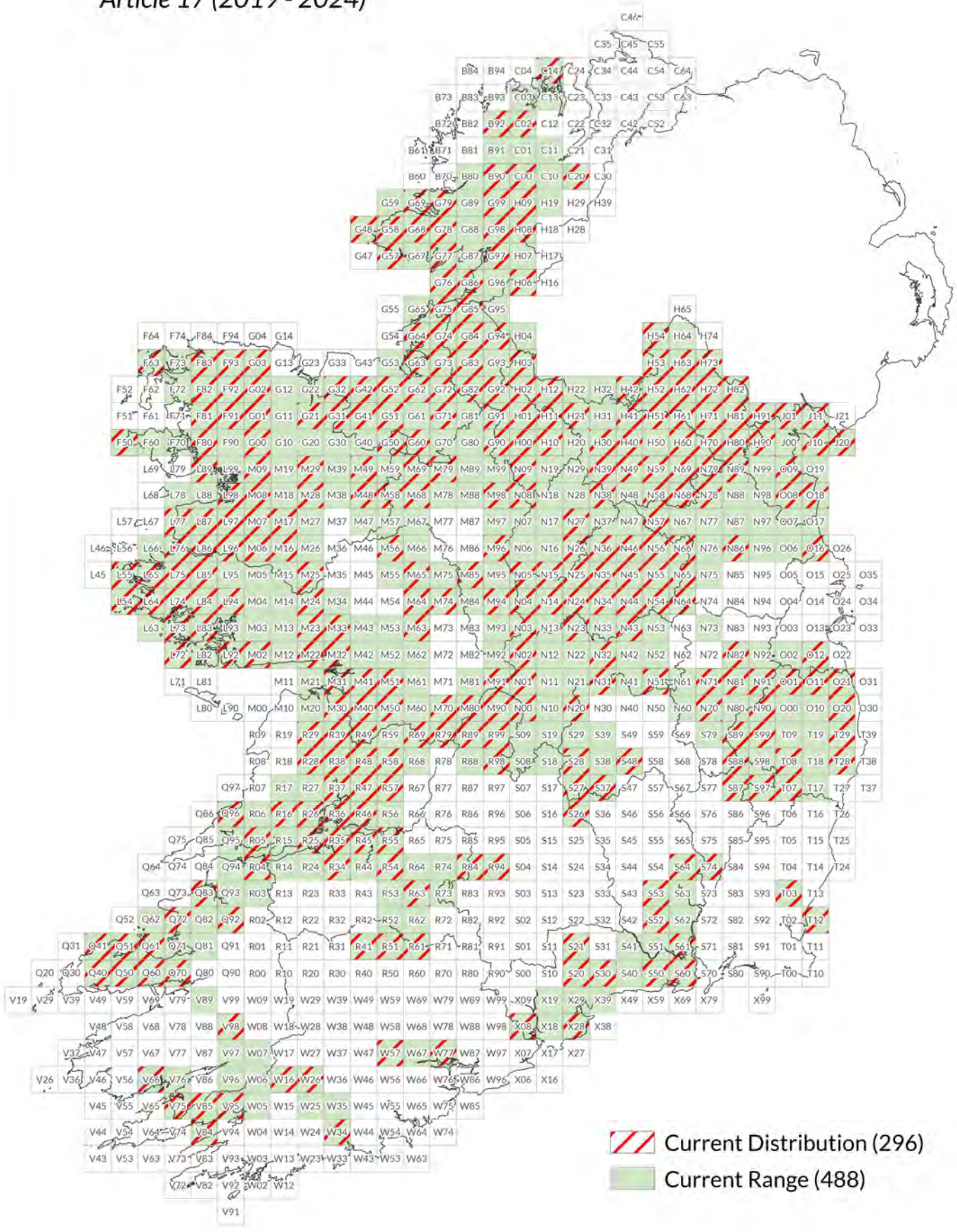
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***3.21 km***^{2}
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	

11.8 Additional information *Optional*	Area within the SAC network and associated trends were estimated by performing a union between the 7140 polygon shapefile and the SAC shapefile and an intersect between the 7140 point shapefile and the SAC shapefile. The areas given in section 11.1 are the minimum and maximum total area of the 7140 habitat in SACs in the country, including some SACs where the habitat is not listed as a qualifying interest (QI). The area of 7140 within the SAC network where it is listed as a QI ranges from 2.19 km² to 14.76 km^2. The accuracy of these area values will be affected by the point shapefile. This is due to the fact that a point may fall within an SAC, but relate to an area partly or entirely outside the SAC network, and vice versa. The significant difference between the habitat extent recorded within SACs during the current reporting period and the last (NPWS, 2019) is primarily due to more accurate data, with the first national survey for the 7140 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period (Brophy *et al*., in prep.). The current area range of 3.66 km² - 31.17 km^2 reported in section 11.1 is smaller than the best estimate of 45.25 km², reported in NPWS (2019). This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7140 area in the NPWS (2019) area calculation, such as the 3.5 km² Garriskil Bog SAC (000679) and 4.7 km² Mount Hevey Bog (002342) and 2 km² Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7230 overlapped by 32.28 km^2 and the habitat polygons of 7140 and 7210 overlapped by 34.85 km^2. Reviewing these polygons and applying more appropriate estimates for the 7230 habitat is a significant cause of the drop in 7230 area found within SACs. There was a recorded net loss of 0.01 ha of 7140 habitat from one SAC over the last two reporting periods, with the remaining 0.59 ha lost from outside SACs. Of the SACs where 7140 habitat is listed as a QI there was no net loss. The short-term trend of the habitat area within the SAC network is taken to be *decreasing*, the same trend as the habitat nationally. There were small recorded area losses over the last 12 years which are considered to be an underestimate of overall losses over the period. The current reporting period is the first time that accurate data have been recorded for this Annex I habitat on a national scale. The short-term trend for the Structure and functions for the habitat within the SAC network is *uncertain*, the same trend as the habitat nationally, as the dataset used to report the percentage of habitat in good condition in NPWS (2019) was limited. As already stated, the current reporting period is the first time that accurate data have been recorded for this Annex I habitat on a national scale.

12 Complementary information *N/A*

Transition mires (7140)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7150 Depressions on peat substrates of the *Rhynchosporion***
1.2i Habitat short name	**Rhynchosporion depressions**
1.3i Habitat description	7150 Depressions on peat substrates of the *Rhynchosporion*, which is defined by the presence of *Rhynchospora alba* and/or *R. fusca* and a number of other species, is considered to be an integral part, and a microhabitat, of *7110 Active Raised bogs and *7130 Active Blanket bog. In raised bogs, *Rhynchospora* vegetation communities are only considered Annex I type (*sensu stricto*) when they occur in their most developed form in the wettest sections of the active raised bogs, which correspond with pools, *Sphagnum* lawns and hollows. 7150 habitat is also an integral part of blanket bog ecosystems, especially lowland blanket bog along the western seaboard. Only when *Rhynchospora* species are associated with plant communities of the naturally wetter, sometime quaking and hydrologically most sensitive areas of blanket bog, and associated wetland habitats, are they considered to correspond with the Annex I 7150 habitat type. Within such areas, 7150 habitat tends to occur in hollows or small depressions or as extensive water tracks and interconnecting shallow pool areas around hummocks, along pool margins and, on low-level flats or lawns that often form an interface between hummocks and bog pools. It can also occur within flushed areas. 7150 habitat is therefore considered to be an integral part of blanket bog, as well as associated flushes (Fossitt PF2), transition mires (7140) and rarely wet heath (4010) ranging from ombrotrophic to minerotrophic, where ground conditions are wet to very wet. Data from extensive blanket bog surveys show that Rhynchosporion vegetation does not appear to occur on Ireland's mountain blanket bog sites above 300 m (Schouten, 1984; Conaghan *et al.,* 2000). 7150 habitat is also reported as occurring in the fluctuation zone of oligotrophic pools with sandy, slightly peaty substrates (Stallegger, 2008). However, according to the National Survey of Upland Habitats (NSUH) (Perrin *et al.,* 2014) it has not been recorded in this context in Ireland. Stallegger (*ibid.*) also reported it as occurring on wet heath; however, this has been recorded exceedingly rarely during the NSUH (Perrin *et al.,* 2014). *Rhynchospora alba* can be found extensively as a single species in modified habitats, such as degraded raised and blanket bogs. It can rapidly colonise and form pioneer communities after cutting/drainage/burning/excessive grazing and trampling, where sufficient acid peat remains and where conditions remain sufficiently wet. Such areas are characterised by disturbed conditions and a depauperate community that lacks the other species indicative of the 7150 habitat such as *Drosera anglica* and/or *D. intermedia* and pool or low lawn moss species such as *Sphagnum cuspidatum* and/or *S.*

	denticulatum. This type of depauperate *Rhynchosporion* vegetation is therefore not considered to correspond with the Annex I 7150 habitat type in the Irish context. The Irish Vegetation Classification (Perrin, 2024) assigned *Rhynchospora* vegetation to the BG1 *Rhynchospora alba – Sphagnum cuspidatum* group.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1949-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The mapped 7150 habitat distribution is based on the 10x10 km grid cell distribution of the host habitats (*7110 Active Raised bogs and *7130 Active Blanket bog) with *Rhynchospora* species records, and actual 7150 habitat records from field surveys. The baseline spatial dataset used was the Article 17 2019 7150 10x10 km grid cell distribution (NPWS, 2019). The 7150 distribution was updated this reporting period by: a) utilising updated Article 17 2025 10 km distributions of the host habitats (*7110 and *7130), in combination with records of *Rhynchospora* species. Records for *Rhynchospora alba* and *R. fusca* were downloaded from the BSBI Plant Atlas (https://plantatlas2020.org/atlas). *Rhynchospora* records (dated 1987 to 2019) were then mapped and intersected with the new 10 km distributions of the host habitats. Only 10x10 km grid cells with a record of the host habitat(s) and *Rhynchospora* species were used to update the 7150 distribution. b) collating records of 7150 habitat from field surveys conducted this reporting period. Recent surveys that recorded 7150 comprise: Barron & Mackin (2022), Hodd (2023), Hodd *et al.* (2022), Scott Cawley (2021), National Fen Survey 2021 to 2023 dataset (Brophy *et al.,* in prep.) and the EU INTERREG CABB BirdWatch Ireland habitat surveys. Only the latter two surveys extended the 7150 distribution in this reporting period (i.e. added new 10x10 km grid cells). The other surveys already overlapped the Article 17 2019 7150 10 km distribution (NPWS, 2019).

	The updated 7150 10 km distribution has 377 grid cells compared to 331 grid cells during the previous reporting period (NPWS, 2019). One grid cell (N25) was removed from the 7150 distribution due to refinement of the *7110 habitat distribution this reporting period. Six new grid cells were added (N38, R66, R98, S14, S25, S27) due to an increase in the *7110 distribution (in combination with records of *Rhynchospora* species within these cells). Thirty-seven new 10x10 km grid cells were added (C23, C30, G22, G43, G48, G52, G61, G64, G72, G83, H04, H10, H16, H28, L56, L68, L78, M18, M24, M27, M45, M57, M61, N10, N30, N90, N92, Q93, Q94, R04, R49, R67, S19, S49, S85, W19, W27) due to an increase in the *7130 habitat distribution this reporting period (in combination with records of *Rhynchospora* species within these cells). Four new grid cells were added based on field surveys that recorded 7150 habitat in this reporting period. These comprise: the EU INTERREG CABB BirdWatch Ireland habitat surveys (G97, G89) and the National Fen Survey 2021 to 2023 dataset (N11, R39).

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**Datasets used to derive the 10 km distribution map:** Article 17 2025 7110 DRAFT Conservation Status Assessment Report (20250320_AR1725_7110_ARB_v2.1.pdf) and associated GIS. Article 17 2025 7130 DRAFT Conservation Status Assessment Report (20241118_AR1725_7130_Habitat_DRAFTv1.doc) and associated GIS. Barron S.J. & Mackin F. (2022) Fiddandarry Bog, Co. Sligo Monitoring Report. Unpublished report for Birdwatch Ireland by BEC consultants and RPS Ireland. BirdWatch Ireland CABB surveys (2019-2020). GIS files for this INTERREG VA project were made by BirdWatch Ireland and NPWS. Brophy *et al.* (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. BSBI Online Plant Atlas 2020. Accessed online: https://plantatlas 2020.org/atlas.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***51,500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 51,500 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ approximately equal to the favourable reference range (less than 2% smaller) ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.	

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 7150 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. Due to improved knowledge from additional sources in the current reporting period (as detailed in section 2.5), there is a 46 10x10 km grid cell increase in range between the previous reporting period (469 cells) and the current reporting period (515 cells). The range map shows that the habitat is mostly concentrated in the west and the midlands, and mostly absent from the east and south-east, except for a few sites in these locations. Following the methodologies outlined in NPWS (2019), the 7150 habitat Range assessment was extrapolated from the host habitats (*7110 Active Raised bog and *7130 Active Blanket bog) Range assessments. Note: The results from the 7130/*7130 assessment were used as a proxy for the host habitat *7130. Short-term and long-term trends for Range of both host habitats have been assessed as *stable*. None of the recorded 7150 area losses that have occurred since 2000 have resulted in the loss of range. For this reason, short-term and long-term trends of 7150 habitat Range is judged to be *stable.* Following NPWS (2019), the Favourable Reference Range (FRR) is the current range reported in section 4.1. There has been no decline since the Directive came into force in 1994, and no enlargement of range is deemed necessary to ensure the long-term survival of the habitat. FRR has increased since the last reporting period (NPWS, 2019) to reflect the improved level of knowledge rather than actual change. The actual range of *7110 has not changed since 1994 (NPWS, 2019). The *7110 Range parameter was given an *Unfavourable-Bad/stable* assessment during the current reporting period, as the *7110 range (19,300 km²) is below the FRR (22,300 km²). The *7110 FRR corresponds with the current *7110 range PLUS the 7120 Degraded Raised bog range. However, as indicated in NPWS (2019), 7150 is not associated with 7120, and on that basis 7120 was not used to inform the FRR of 7150. Following the approach applied in NPWS (2019), the Range of 7150 when associated with *7110 is deemed to be *Favourable/stable*. The 7130/*7130 Range was given a *Favourable/stable* assessment during the current reporting period. As a result, the Range of 7150 when associated with *7130 is deemed to be *Favourable/stable*. This implies an overall Range assessment of *Favourable/stable* for the 7150 habitat.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1949-2024***	
5.2 Surface area	**a) Minimum**	

(in km²)	**b) Maximum**	
	c) Best single value	***20.27 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/* ***pre-defined range***	

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	Unknown
5.17 Additional information *Optional*	The period over which the surface area of the habitat was determined begins in 1949 when bog and heath relevés were recorded by Braun-Blanquet and Tüxen (data utilised in Perrin, 2024) and incorporates updates made by surveys up until 2024. These resources are presented in section 3.4. Area was calculated using the methodology outlined in NPWS (2019) with some modifications. Following NPWS (2019), 7150 habitat is estimated to occur on 5% of *7110 Active Raised bog. NPWS (2013, 2019) estimated that 7150 habitat occurred on 0.8% of 7130/*7130 Blanket bog. This percentage was originally calculated using the mean percentage cover values for 7130/*7130 and 7150 at fourteen NSUH sites. For the current reporting period, this percentage was revised to take account of the seven additional NSUH sites that were surveyed since the original calculation and to only use the mean percentage values for *7130 Active Blanket bog (i.e. excluding inactive). The revised analysis of 21 NSUH sites estimates that 7150 habitat occurs on 0.6% of *7130 Active Blanket bog. However as 7150 is a predominantly lowland habitat and as lowland blanket bog is under-represented in the NSUH surveys to date the current estimate for 7150 in blanket bog is likely to be an underestimate. The 7150 habitat area is estimated as follows: 5% of the national area of *7110 (18.53/100 x 5%) = 0.93 km^2 0.6% of the national area of 7130/*7130 minus the area of National Land Cover (NLC) 'Cutover Bog' polygons (3,768.11-544.62/100 x 0.6%) = 19.34 km^2 Total area = 20.27 km^2 The recorded surface area of 7150 habitat has decreased from 21.43 km^2 in NPWS (2019) to 20.27 km^2 this reporting period. This is primarily due to an improved level of knowledge and different method (i.e. using 0.6% instead of 0.8%). Following the methodologies outlined in NPWS (2019), the 7150 habitat Area assessment has been aligned to the Area assessments of the host habitats (*7110 Active Raised bog and *7130 Active Blanket bog). Note: The results from the 7130/*7130 assessment were used as a proxy for the host habitat *7130. The assessment places a particular emphasis on *7130 as this comprises the dominant host habitat, estimated to support 95.4% of the 7150 habitat (19.34/20.27 x 100). *7110 supports an estimated 4.6% of the 7150 habitat (0.93/20.27 x 100). Short-term trend direction for Area for 7150 habitat was determined to be decreasing. This largely follows the current 7130/*7130 assessment which was given a *decreasing* trend. Conversely, short-term trend direction for *7110 was determined to be *increasing*. Any

	increases in 7150 on *7110 would not offset the losses of 7150 on *7130. Long-term trend direction for Area for 7150 habitat was determined to be *decreasing*. Both host habitats were given a *decreasing* long-term trend for the current reporting period. NPWS (2013) considered that the 7150 habitat area when the Habitats Directive came into force in 1994 was sufficient to ensure the long-term survival of the habitat. While the Favourable Reference Area of 7150 habitat is unknown, it is deemed to be more than the current area but less than 10% more, given that anthropogenic losses have occurred since the Directive came into force. Following NPWS (2019), the 7150 Area assessment has been aligned to the assessments given to both host habitats (*7110 and *7130). Note: The results from the 7130/*7130 assessment were used as a proxy for the host habitat *7130. 7130/*7130 has an *Unfavourable-Inadequate/decreasing* Area assessment while *7110 has an *Unfavourable-Bad/increasing* Area assessment for the current reporting period. A 7150 habitat Area assessment of *Unfavourable-Inadequate/ decreasing* was assigned; this closely follows the Area assessment of the dominant host habitat *7130.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***15.20 km²***
		Maximum	***18.24 km²***
	b) Area in not-good condition	**Minimum**	***2.23 km²***
		Maximum	***5.07 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The list of typical species has not changed since NPWS (2019). Typical 7150 habitat species on raised bogs are: *Eriophorum angustifolium, Drosera anglica, D. intermedia, Menyanthes trifoliata, Narthecium ossifragum, Rhynchospora alba, R. fusca, Sphagnum cuspidatum, S. denticulatum, S. medium, S. papillosum, S. pulchrum* and *Utricularia minor.* Typical 7150 habitat species on blanket bogs are: *Eleocharis multicaulis, Eriocaulon aquaticum, Eriophorum angustifolium, Campylopus atrovirens, C. brevipilus, Carex limosa, Carex panicea, Drosera anglica, D. intermedia, Juncus bulbosus, Menyanthes trifoliata, Narthecium ossifragum, Potamogeton polygonifolius, Pleurozia purpurea, Rhynchospora alba,* occasionally *R. fusca, Sphagnum denticulatum, S. cuspidatum, S. compactum, S. tenellum, S. medium, S. papillosum, S. pulchrum, Utricularia minor, U. intermedia* and *Zygogonium* agg. algae.
6.8 Additional information *Optional*	When associated with uplands and blanket bogs, Perrin *et al.* (2014) sets out the standard guidance for assessing 7150 Structure and functions at a monitoring stop level using criteria to assess 7150 vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. Within the uplands, one monitoring stop was recorded in 7150 habitat at one NSUH site (Loughatorick South Bog SAC (000308)) within the current reporting period. This stop passed all 7150 assessment criteria. Four monitoring stops were recorded in 7150 habitat at the blanket bog restoration site, Fiddandarry Bog, within the Ox Mountains Bogs SAC (002006) in 2021. These four stops passed all 7150 assessment criteria. Four of these five stops were recorded at a site where drains had been blocked in the preceding year. Extrapolating from the five stops is not considered adequately representative. NPWS (2019) extrapolated the Structures and functions assessment from the *7130 assessment. That approach is thought likely to have been somewhat harsh for this habitat since 7150 is associated with the wettest areas of *7130 which can be less susceptible to certain pressures such as fires (unless severe or combined with drainage or drought conditions) and since grazing stock tend to avoid the wettest areas (except where stock densities are very high). Additionally, there is more protection within SACs than without against excavation of new

	drainage which would be most detrimental to 7150. Expert judgement was used to assess Structure and function of 7150 as *Unfavourable-Inadequate*. The thresholds for *Unfavourable-Inadequate* were used to derive the min/max areas in field 6.1. Improving trends are reported for raised bog. Conservation measures are increasing on blanket bog (e.g. ACRES CP and drain blocking works) and are set to expand further, although improving trends may take a number of years to realise. The short-term trend for Structure and functions of 7150 in good condition is assessed as *stable*. For the 7150 habitat an *Unfavourable-Bad/stable* assessment was assigned. This assessment partly aligns with the dominant host habitat *7130.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	High
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	High
PA18 Agricultural activities generating air pollution	Ongoing and likely to be in the future	Minority <50%	Medium
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Medium
PB01 Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low
PB26 Other forestry activities, excluding those relating to agro-forestry	Ongoing and likely to be in the future	Minority <50%	Low
PD01 Wind, wave and tidal power (including infrastructure)	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low

PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R02685 *Campylopus introflexus* R12976 *Rhododendron ponticum* R03227 *Cervus nippon*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Article 17 2025 7110 DRAFT Conservation Status Assessment Report (20250320_AR1725_7110_ARB_v2.1.pdf). Article 17 2025 7130 DRAFT Conservation Status Assessment Report (20241118_AR1725_7130_Habitat_DRAFTv1.doc). Aherne, J., Wilkins, K. & Cathcart, H. (2021) Nitrogen-Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats. EPA Research Report No. 390. McCumiskey House, Richview, Clonskeagh, Dublin 14. DAFM (2017) Land Types for Afforestation. Department of Agriculture, Food & the Marine (DAFM), Johnstown Castle Estate Co. Wexford. Accessed from: https://www.watersoflife.ie/app/uploads/2023/07/Land-Types-for-Afforestation-Forest-Service-2018.pdf DAFM (2024) Land Types for Afforestation: Soil & Fertility. Department of Agriculture, Food and the Marine (DAFM) Johnstown Castle Estate Co. Wexford. Dykes, A.P. (2008) Natural and anthropogenic causes of peat instability and landslides. In Farrell C, Feehan, J (Eds.), After Wise Use – The Future of Peatlands. Proceedings of the 13th International Peat Congress (Volume 1). International Peat Society, Jyväskylä, 39-42. Dykes, A.P. (2022) Landslide investigations during pandemic restrictions: initial assessment of recent peat landslides in Ireland. *Landslides,* 19, 515–525.

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7.4 Additional information *Optional*	Pressures and threats reported here were selected based on a review of the impacts occurring within the 7150 host habitats (*7110 Active Raised bog and *7130 Active Blanket bog) during the current reporting period, as well as 7150 habitat impacts recorded during recent NSUH surveys (Hodd *et al.,* 2022). NPWS (2019) and Fernandez & Eakin (in prep.) were also consulted. An unpublished report, comprising a draft 2019-2024 NPWS Irish Wildlife Manual (IWM) with information on the conservation status of the 7150 habitat within the raised bog environment, was not available at the time of writing (F. Fernandez, pers. comm.). PC05 'Peat extraction' is considered a high-influence pressure for the 7150 habitat. The assessments of both host habitats identify PC05 as an ongoing, high-influence pressure, occurring both inside and outside the protected habitat network. PA07 'Intensive grazing or overgrazing by livestock' is considered a high-influence pressure for the 7150 habitat. This habitat does not

	require grazing for the maintenance of its structure and functions. Overgrazing can reduce species diversity, cause damage and erode this sensitive habitat. During the current reporting period, overgrazing was recorded as having a negative influence within a limited area of 7150 habitat at the NSUH site, Loughatorick South Bog SAC (000308) (Hodd *et al.,* 2022). The current 7130/*7130 assessment identifies PA07 (i.e. sheep overgrazing) as a high-influence pressure. PA07 does not feature in the current *7110 assessment, indicating overgrazing it is not a major issue for 7150 when associated with raised bogs. PA09 'Burning for agriculture' and PH04 'Vandalism or arson (incl. human-introduced wild fire)' are considered high-influence pressures for the 7150 habitat. Unregulated burning can reduce plant species diversity, as well as often causing significant damage to the bryophyte layer. Burning also contributes to peat erosion, desiccation of the habitat and may encourage the spread of grasses, particularly *Molinia caerulea* (Glaves *et al.,* 2013). The 7130/*7130 assessment identified PA09 and PH04 as high-influence pressures. While the wettest parts of bogs (where 7150 habitat is likely to occur) are less likely to burn due to a higher water table and lower dry biomass, burning can still occur, particularly after periods of dry weather or other water table disturbances (e.g. drainage). The *7110 assessment identifies PH04 as a low-influence pressure, with this activity recorded from six of the 46 sites (13.0%) surveyed this reporting period. PL02 Drainage is considered a high-influence pressure for the 7150 habitat. The current assessment for 7130/*7130 identifies PL02 as a medium-influence pressure. The current assessment for *7110 identifies PL02 as a high-influence pressure, with this habitat particularly vulnerable to drainage due to its characteristic dome shape. Other drainage codes, comprising PB24 'Drainage for forestry' and PA22 'Drainage for use as agricultural land', were added as medium-influence pressures for the 7150 habitat These are listed as medium-influence pressures in the current *7110 assessment. PB01 'Conversion to forest from other land uses, or afforestation (excluding drainage)' is considered a medium-influence pressure for the 7150 habitat, having been recorded as a high-importance pressure during the previous reporting period (NPWS, 2019). The 7150 habitat is typically associated with wet, deep peats (Perrin, 2024). DAFM afforestation guidance this reporting period (DAFM, 2017; DAFM, 2024), if strictly adhered too, would have discouraged afforestation within these areas, thereby affording some protection to the 7150 habitat. The current 7130/*7130 assessment identifies PB01 as a high-influence pressure, with the current *7110 assessment identifying PB01 as a medium-influence pressure. PB26 'Other forestry activities, excluding those relating to agro-forestry' (i.e. the impact of fire breaks) is considered a low-influence pressure for the 7150 habitat. This code is listed as a low-influence pressure in the current 7130/*7130 assessment. PA18 'Agricultural activities generating air pollution' is considered a medium-influence pressure for the 7150 habitat. The current 7130/*7130 assessment identified PA18 as high-influence pressure,

	citing Aherne *et al.* (2021) as evidence. Aherne *et al.* (2021) indicated the plant species of *7130 Active blanket bog are highly sensitive to total nitrogen deposition. This study did not do a similar assessment for the plant species of the 7150 habitat. A similar code, PK04 'Atmospheric N-deposition', is used in the *7110 assessment, with this impact considered a medium-influence pressure, citing Kelleghan (2019, 2020, 2021) as evidence. During the current reporting period, field evidence of nitrogen deposition (e.g. degraded *Sphagnum* hummocks, algal growth on *Calluna*) was observed during ecotope surveys of raised bog. Since the current *7110 assessment report identifies agriculture as the dominant source of nitrogen emissions, only the generalised code, PA18 'Agricultural activities generating air pollution', is used in section 7.1. PF05 'Sports, tourism and leisure activities' and PI02 'Other invasive alien species (other than species of Union concern)' were added as low-influence pressures this reporting period. These impacts were having a negative influence on a limited area of 7150 habitat at the NSUH site Loughatorick South Bog SAC (000308) (Hodd *et al.,* 2022). PF05 and PI02 are listed as medium-influence pressures in the current 7130/*7130 assessment, with PI02 listed as a low-influence pressure in the *7110 assessment. PE01 'Roads, paths, railroads and related infrastructure', PM07 'Natural processes without direct or indirect influence from human activities or climate change', PM05 'Avalanches, landslides and collapse of terrain' and PD01 'Wind, wave and tidal power (including infrastructure)' were added as low-influence pressures. PE01 is listed as a low-influence pressure in the current *7110 assessment, while all four (PE01, PM07, PM05, PD01) are listed as medium-influence pressures in the current 7130/*7130 assessment, with the authors noting that these activities, while often localised, can be severe and cause loss of habitat area. Despite these impacts having a medium influence on the dominant host habitat, they would be expected to occur less commonly within the 7150 habitat (i.e. warranting a low influence assessment rather than medium influence assessment). Other low-influence pressures added include: PA01 'Conversion into agricultural land (excluding drainage and burning)' and PI03 'Problematic native species' (which are both *7110 low-influence pressures), and PK03 'Mixed source air pollution, air-borne pollutants' (a low-influence pressure for 7130/*7130). Similar to the host habitats, PJ01 'Temperature changes and extremes due to climate change' and PJ03 'Changes in precipitation regimes due to climate change' are assessed as low-influence pressures for 7150 but are considered medium-importance threats. Renou-Wilson & Wilson (2018) indicate areas will be impacted by climate-induced disturbances, "including (1) gradual changes (in temperature; in the amount, intensity and seasonal distribution of precipitation) and (2) extreme events (severe drought; increased wildfires; flooding events)". An increased risk of severe fire events is likely in areas where drought periods increase as a result of climate change. Intense fires can burn away shallow peat soil or expose it to erosive elements such as extreme rainfall events. Invasive non-native species may also pose a greater risk to 7150 habitat if their growth conditions are favoured

	by changes in climate. Intense summer heat causing desiccation and cracking of the surface peat, followed by subsequent intense rainfall events may be expected to increase the risk of peat landslides (Dykes, 2008, 2022). Areas in unfavourable condition will be more susceptible to the impacts of climate change.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MA13 Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats) MA14 Other measures related to agricultural practices MB01 Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) MC02 Adapt/manage exploitation of energy resources MC07 Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MK01 Reduce impact of mixed source pollution MK03 Restoration of habitats impacted by multi-purpose hydrological changes MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Conservation measures were selected based on the measures listed for the host habitats (*7110 Active Raised bog and *7130 Active Blanket bog) during the current assessment, NPWS, INTERREG VA projects, LIFE IP projects, EIP-AGRI projects, EU Horizon 2020 projects, Department of Agriculture, Food and the Marine (DAFM) and Coillte. An unpublished report, comprising a draft 2019-2024 NPWS Irish Wildlife Manual (IWM) with information on the conservation status of the 7150 habitat within the raised bog environment, was not available at the time of writing (F. Fernandez, pers. comm.). A range of agri-environmental schemes were in operation this reporting period, including several European Innovation Partnerships (EIPs) that promoted sustainable use of peatlands (e.g. Sustainable Uplands Agri-environment Scheme (SUAS) EIP, MacGillycuddy Reeks

	EIP). The primary scheme which may have some positive impacts, particularly on 7150 habitats associated blanket bogs, is the Agri-Climate Rural Environment Scheme (ACRES), which is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high priority geographical areas are included under ACRES Co-operation (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable). Given the wide scope and geographical spread of ACRES, it is likely that there are some positive benefits for the 7150 habitat, through regulation and reduction of grazing intensity and fires (MA06, MA05). Low-emission slurry spreading reduces nitrogen losses to the air and subsequent nitrogen deposition in sensitive habitats. There is currently a Low Emission Slurry Spreading (LESS) Equipment Scheme available to farmers to assist them to buy new slurry-spreading equipment. ACRES also promotes the practice of low-emission slurry spreading amongst participating farmers by issuing a payment to farmers for adopting the measure (MA14, MK01). The FarmPEAT (Farm Payments for Ecological and Agricultural Transitions) Project was involved in blocking a limited number of agricultural drains on the margins of the raised bog (MA13) during the current reporting period. EU LIFE IP Wild Atlantic Nature (WAN) is a nine-year environmental project (2021-2029) that aims to improve Ireland's performance in conserving habitats, and in particular to improve the conservation status of blanket bog SACs. Though the focus is on blanket bogs it is anticipated this project will also result in an improvement in the condition of 7150 habitat within the project area. Within the LIFE IP WAN project area, there are 35 blanket bog SACs with a total area of 262,632 ha. Central to the project was a pilot Results-Based Payment Scheme (RBPS) conducted 2021/22. Over 820 farmers across 63,000 ha of Natura 2000 and neighbouring lands participated in the pilot (MA05). Supporting actions in the scheme included: fencing (MA05), invasive species control (MI03), peatland restoration and drain blocking (MA13, MB14, MC02, MC07, MK03). This RBPS built capacity for the CAP Strategic Plan 2023, and the learnings from the pilot informed the development of ACRES CP. EU LIFE IP WAN also facilitates delivery of training to a wide range of peatland stakeholders. They are involved in demonstrating the restoration of eroded and drained peatlands (MM01, MK03) in Co. Leitrim, and demonstrating forest to bog restoration (MB14) on private lands in Co. Mayo and within Wild Nephin National Park (WAN, 2024). LIFE EU IP WAN are also involved in developing a pilot retrofitting and restoration initiative to help address turf-cutting in SACs by providing homeowners with alternative energy sources. This pilot is looking to demonstrate the deep retrofitting of homes as a way to reduce demand for turf. Simultaneously, participants will agree to restore areas damaged by turbary activity in SACs (MC02) and agree to

	manage peatland habitats on their farms in a sustainable manner (WAN, 2024). Within the raised bog environment, a turf-cutting compensation scheme is ongoing (MC02). A decrease in the extent of turf-cutting within SACs and 'Retained' NHAs was observed this reporting period by NPWS. Outside of designated sites, Bord na Móna, following a partial harvest in 2019, fully suspended their peat harvesting operations in 2020 (MC02). Site-specific restoration plans for raised bogs are currently being implemented by NPWS with works undertaken at *c.* 31 designated sites (SACs and NHAs) from 2018-2024 under the National Raised Bog Restoration Programme and 'The Living Bog' EU LIFE project. Measures conducted include: drain blocking, with 525 km of drain blocked this reporting period, trench and contour bunding, conifer plantation removal/open habitat restoration, and invasive species control (MC07, MK03, MB14, MI03). Two EU INTERREG VA projects, Cooperation Across Borders for Biodiversity (CABB) and Collaborative Action for the Natura Network (CANN), conducted during this reporting period, were directly connected to the protection and restoration of blanket bog Natura 2000 sites. As part of CABB (2017-2022), 35 km of drains were blocked at Fiddandarry Bog within Ox Mountains Bog SAC (002006) in 2020 (MB14). This has rewet 450 ha of blanket bog, with benefits for 7150 habitat (which has a significant occurrence at the site). As part of CANN (2017-2022), restoration actions in Cuilcagh-Anierin Uplands SAC (000584) included drain blocking (MK03), control of eroding peat using natural materials such as coir rolls and heather brash (MM01), invasive species control (MI03), the development of a wildfire management strategy for the SAC (MA05) and track development to reduce impacts on sensitive habitats (MF03). The CANN project trained local landowners in peatland restoration techniques. The 7150 habitat present within this site is likely benefitting from these restoration actions. WaterLANDS (2021-2026) is funded through the EU Horizon 2020. The Irish action site, which is coordinated by EU LIFE IP WAN, is located in Cuilcagh-Anierin Uplands SAC (000584). WaterLANDS aims to restore over 500 ha of blanket bogs habitat between September 2024 and March 2025. Actions include: invasive conifer control (MI03), implementing measures to control erosion (MM01), reprofiling of peat haggs, reprofiling turf banks (possible benefits of the latter measure are unproven therefore this is experimental), and improving water levels (MK03) (WAN, 2024). NPWS administers the Peatlands and Natura Community Engagement Scheme (2018-ongoing), this scheme provides funding for local initiatives that enhance awareness and conservation of raised and blanket bogs and other habitats within Natura sites. The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Excel spreadsheet was reviewed for measures associated with 7150 habitat. A range of measures were listed that may have a

	positive impact on 7150 habitat. These include ten instances of invasive species (primarily Rhododendron) control or mapping (MI04) across six SACs in the west of Ireland (000140 Fawnboy Bog/Lough Nacung SAC, 000476 Carrowmore Lake Complex SAC, 002031 The Twelve Bens/Garraun Complex SAC, 002034 Connemara Bog Complex SAC, 002047 Cloghernagore Bog and Glenveagh National Park SAC and 002343 Tullaher Lough and Bog SAC). One instance of deer culling (002047 Cloghernagore Bog and Glenveagh National Park SAC) (MI05) and one incidence of fence replacement to prevent trespassing sheep (002031 The Twelve Bens/Garraun Complex SAC) (MA06). The extent of 7150 habitat impacted by these measures was not provided. Coillte are currently increasing the area of their estate managed primarily for nature, from 20% to 30% by 2025. Any remaining open habitat not currently in an existing Coillte 'Biodiversity Area' will be identified by this project and a set of provisional management prescriptions identified (e.g. invasive species control, drain blocking). Poorly developed conifer plantations on peat are also being targeted by this project, with the view to restore these areas to open habitat (MB14). Since 2024, DAFM state that afforestation on peat soils with a depth of 30 cm or less is permitted. This replaces the former allowance (pre-2024) for afforestation on peat with a depth of 50 cm or less. A new spatial layer is available on INET/IFORIS, with this layer being a composite of the Derived Peatland map V2, National Landcover map and Irish Soils Database. It will be assumed for the purpose of afforestation applications that peat soils within these areas are as categorised, unless proven otherwise (MB01). (Accessed from: https://assets.gov.ie/268255/3df078e5-131e-4434-88ee-8a8361ce3330.pdf.) This measure is likely to result in a reduction of peatland habitat impacted through afforestation but will not preclude this from occurring. Field assessment of lands proposed for forestry, by experienced peatland ecologists, is vital for peatland protection.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The 7150 habitat Future prospects for Range and Area were extrapolated from the Future prospects assessments of the host habitats (*7110 Active Raised bog and *7130 Active Blanket bog). Range is assessed as *Favourable* and therefore the Future prospects are considered to be *Good*. The Area parameter of the primary host habitat *7130 is assessed as *Unfavourable-Inadequate/declining*; there are a number of measures planned or in place for this habitat that may reverse this trend in future reporting cycles, however the Future prospects are currently assessed as *Poor*.	

	Current or planned measures for *7130 are also likely to improve the condition of the habitat in future cycles. The Future prospects for Structure and functions are assessed as Poor. Therefore, the overall assessment of Future prospects is *Unfavourable-inadequate*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */ unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	Following the methodologies outlined in NPWS (2019), the 7150 conservation status conclusions were extrapolated from the host habitats, with a bias towards the *7130 assessment for Range and Area.	

	Structure and functions were assessed using best expert judgement based on limited data. 7150 was given the following overall assessment: Range is *Favourable/stable* (as detailed in section 4.14); Area is *Unfavourable-Inadequate/decreasing* (as detailed in section 5.17); Structure and Functions are *Unfavourable-Inadequate/stable* (as detailed in section 6.8); Future prospects are *Unfavourable-Inadequate* (as detailed in section 9.2); Overall Conservation Status is *Unfavourable-Inadequate/deteriorating*. Trend in Overall Conservation Status was assessed as *deteriorating* this reporting period, as it was in the previous reporting period. The deteriorating trend is largely due to Area losses within blanket bogs during the current and previous reporting period. This resulted in a *decreasing* short-term trend for Area. Short-term trend for Range and Structure and functions are *stable*.

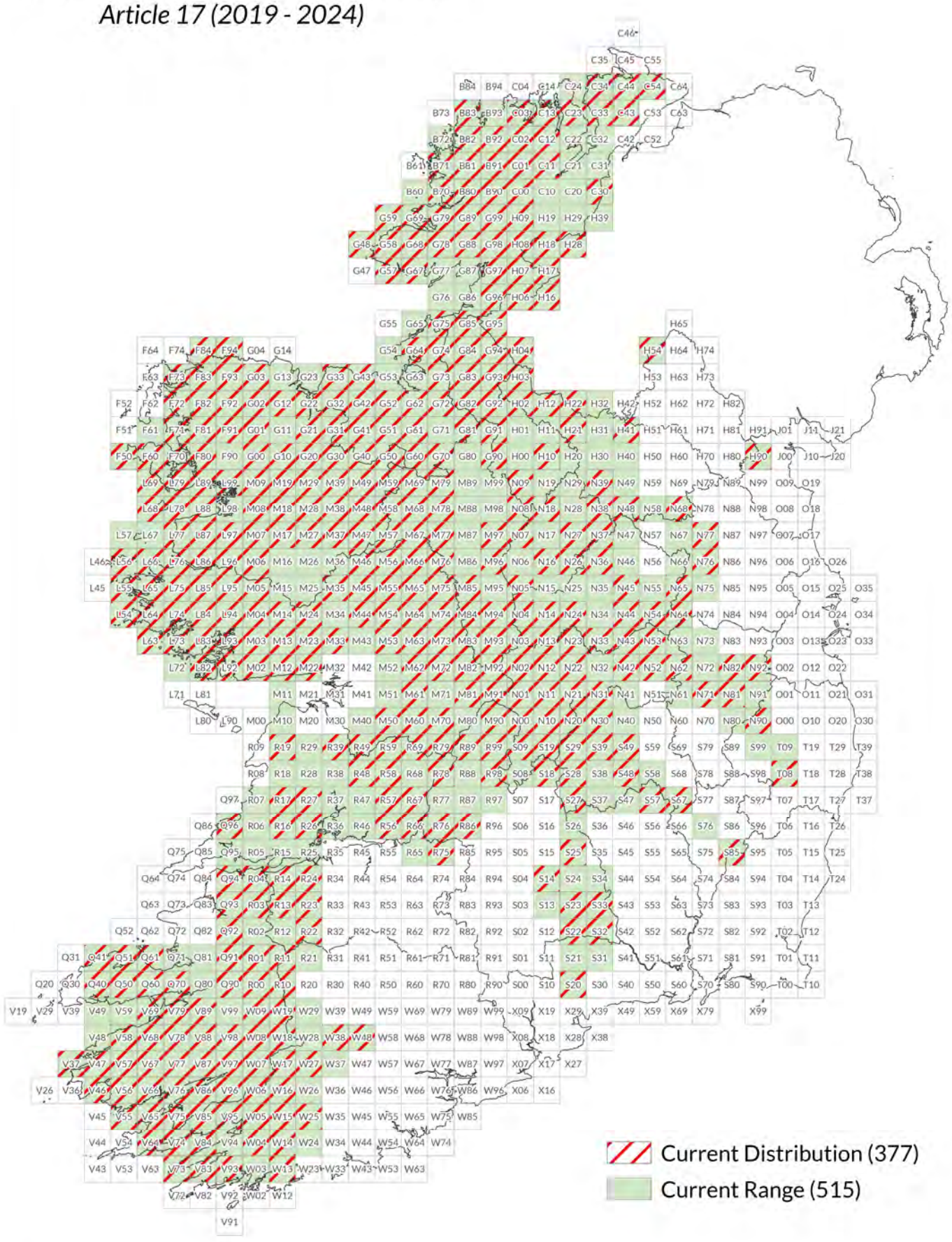
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***11.51 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a)*** ***stable*** *b) increasing* *c) decreasing* *d) uncertain*	

	e) unknown
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	The area given in section 11.1 is the total area of 7150 habitat within SACs (56.8% of total national area), including SACs where 7150 is not listed as a qualifying interest (QI). The method for calculating the area of 7150 within the network is outlined below: *7110 within the network is 12.13 km^2, therefore 7150 associated with *7110 (12.13/100 x 5%) = 0.61 km^2 7130/*7130 within the network minus the National Land Cover (NLC) 'cutover bog' polygons within the network is 1,817.00 km^2. Therefore 7150 associated with *7130 (1817.00/100 x 0.6%) = 10.90 km^2 Total area within the network = 11.51 km^2 The area of 7150 within the Natura 2000 network where 7150 is listed as a QI is 6.74 km^2. The short-term trend of the 7150 habitat area within the SAC network is taken to be *decreasing* overall, the same trend as the dominant host habitat *7130. The *7110 habitat was assessed as *stable* within the network for the current reporting period. The short-term trend of the 7150 habitat in good condition within the SAC network is assumed to be *stable*, the same trend as both host habitats within the network. The recorded surface area of 7150 habitat within the SAC network has decreased since the last reporting period (13.66 km^2) due to a different method and improved knowledge lending itself to a refinement of areas.

12 Complementary information *N/A*

Rhynchosporion depressions (7150)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae****
1.2i Habitat short name	***Cladium* fens**
1.3i Habitat description	The Annex I habitat *Cladium* fens refers to *Cladium mariscus* beds which are in contact with species-rich vegetation of small-sedge fens (i.e., *Cladium mariscus* and species of the *Caricion davallianae*). This can occur where there are species-rich open swards of *Cladium mariscus* with elements of small-sedge fen, fen meadow and tall-herb fen, or where mono-dominant stands of *Cladium mariscus* transition to or form a mosaic with small-sedge fen, fen meadow and tall-herb fen habitats. This latter situation tends to be more common in Ireland. In these instances, the whole stand of *Cladium mariscus*, including areas that support species-poor vegetation, is referable to the Annex I habitat. *Cladium* fen can occur in a wide range of habitats, in both topogenous and soligenous situations, such as the emergent zone of calcareous lakes, valley fens, floodplains, wet meadows and mineral-rich flush areas within blanket bogs in the west of Ireland. The habitat is characterised by waterlogged peat soils, a high water table (at or above the surface), and near neutral to alkaline, oligotrophic to mesotrophic water. *Cladium* fens are found throughout Ireland, most commonly in lowland areas in the midlands and west. They are occasional elsewhere. The 7210 habitat is comprised of a group of plant communities including FW3H *Cladium mariscus – Phragmites australis* swamp, and occasionally, FE1A *Schoenus nigricans – Campylium stellatum* (Perrin, 2024).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2005-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution map for the 7210 habitat in Ireland was developed from the polygons included in the 2013-2018 Article 17 distribution file (Long *et al.*, 2018), Galway County Council (2017), Smith & D'Arcy (2020), O'Neill *et al.* (2021) and the NPWS National Fen Survey 2021 to 2023 dataset. In addition to the sources listed above, the distribution map utilised points digitised from the 2013-2018 Article 17 distribution file (Long *et al.*, 2018) and the NPWS *Vertigo* monitoring survey 2021 to 2024. All polygons and points were included unless they were superseded by more recent data, or if a review with remote imagery showed that 7210 habitat was not present. Data sources listed in Section 3.4 that recorded the 7210 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g. based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 7210 habitat. Additional relevant data sources gathered during the current reporting period were also reviewed but were not included in the distribution map as there were no 7210 data present. However, these data sources were useful in refining the previous distribution map (NPWS, 2019).

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Long, M.P., Crowe, O., Kimberley, S. & Denyer, J. (2018) Backing document – National Conservation Status Assessments (NCAs) for three fen habitat types: 7140 – Transition mires and quaking bogs, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae, 7230 – Alkaline fens. Unpublished report to National Parks and Wildlife Service. NPWS National Fen Survey 2021 to 2023 dataset. NPWS *Vertigo* monitoring survey 2021 to 2024 dataset. O'Neill, F.H., Perrin, P.M., Denyer, J., Martin, J.R., Brophy, J.T. & Daly, O.H. (2021) Scoping study and pilot survey of fens. *Irish Wildlife Manuals*, No. 143. National Parks and Wildlife Service, DHLGH, Ireland.

	Perrin, P.M. (2024) Irish Vegetation Classification: Community synopsis FE1A *Schoenus nigricans – Campylium stellatum* fen. https://biodiversityireland.ie/ivc-classification-explorer/fe1/fe1a/. Accessed 10th October 2024. Perrin, P.M. (2024) Irish Vegetation Classification: Community synopsis FW3H *Cladium mariscus – Phragmites australis* swamp. https://biodiversityireland.ie/ivc-classification-explorer/fw3/fw3h/. Accessed 10th September 2024. Smith, G.F. & D'Arcy, D. (2020) Desktop survey of wetland sites in County Westmeath. Report prepared for Westmeath County Council. **Other publications consulted for additional information:** Anon. (2022) Explanatory notes in support of the reporting format referred to in Article 17 of Directive 92/43/EEC (Habitats Directive). Final version November 2022. European Commission. Hammond, R. F. (1979) The Peatlands of Ireland. Soil Survey Bulletin No. 35, Teagasc, Dublin. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. O'Connell, C. A., Madigan, N., Whyte, T. & Farrell, P. (2021) Peatlands and Climate Change Action Plan 2030. Irish Peatland Conservation Council, Co. Kildare. Ridding, L.E., Watson, S.C.L., Newton, A.C., Rowland, C.S. and Bullock, J.M. (2020) Ongoing, but slowing, habitat loss in a rural landscape over 85 years. *Landscape Ecology*, 35, 257-273.

4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***21,700 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ <u>approximately equal to the favourable reference range (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 7210 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The range has changed from 18,800 km² (NPWS, 2019) to 21,700 km² due to more accurate data, with the first national survey for the 7210 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. This increase in range is due to 7210 habitat being recorded in 16 additional 10x10 km grid cells during the current reporting period. There are six grid cells where 7210 was previously recorded (NPWS, 2019), but a review of the current data sources (listed in section 3.4) found no evidence for the habitat. It was concluded that 7210 was previously recorded in error within these grid cells, rather than the habitat being lost, as no evidence was found for significant change at each of these six sites since they were added to the 7210 distribution in 2013.

The Favourable Reference Range (FRR) has been updated to match the new range. The NPWS National Fen Survey 2021 to 2023 visited 75 sites where an area of 7210 habitat was mapped. Although there was evidence of a reduction in the area of 7210 habitat at specific sites, due to factors such as conversion into agricultural land and drainage, there was no evidence of a reduction in the range of the habitat.

O'Connell *et al*. (2021) and their analysis of Hammond (1979) showed that there has been a significant decline in the area of all fen habitats over the 42 years 1979-2020, inclusive. On a county level, the data presented in O'Connell *et al*. (2021) is highly variable, and no evidence is presented for a total loss of fen habitat from any one county.</td></tr>
</table>

	Therefore, although there is evidence of a significant reduction in the area of 7210, there is no evidence from these data of a significant decline in the range (i.e., the loss of 7210 from a county). Based on extrapolation from these data it is concluded that short-term and long-term trend for the Range parameter is *stable*. In order to provide more accurate data for assessing the status of the 7210 range, selected sites should be revisited during the next reporting period, in particular, sites visited during the NPWS National Fen Survey. The distribution map shows that the 7210 habitat is widespread, found in 24 of the 26 counties. Based on the available data the current range for the 7210 habitat is thought to encompass the ecological and geographical variation of the habitat and is sufficiently large to ensure its long-term viability. The analysis of Hammond (1979) undertaken by O'Connell *et al*. (2021) shows there has been no significant reduction in the range (i.e. no loss of fen habitat from any one county). These data informed a reference-based approach, with information of moderate quality (i.e. good data on actual distribution and ecological requirements but limited historical distribution data) used to inform the expert opinion that the current range is approximately equal to the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2005-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	***5.24 km²***
	b) Maximum	***30.33 km²***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown* There are small recorded area losses over the last 12 years which are considered to be an underestimate of overall losses over the period	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ *0 – 12%* ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	***Short-term trend magnitude is unknown***
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2"></td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ <u>between 51% and 100% smaller than the FRA</u></td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The area of 7210 habitat in Ireland was calculated using the polygons mapped by the 2013-2018 Article 17 shapefile (Long et al., 2018), Galway County Council (2017), Smith & D'Arcy (2020), O'Neill et al. (2021) and the NPWS National Fen Survey 2021 to 2023 data. In addition to the sources listed above, the area calculation also utilised points from the 2013-2018 Article 17 shapefile (Long et al., 2018) and the NPWS Vertigo monitoring survey 2021 to 2024. All polygons and points were included unless they were superseded by more recent data, or if a review using remote imagery showed that 7210 habitat was not present.

For Galway County Council (2017), O'Neill et al. (2021) and the NPWS National Fen Survey 2021 to 2023 data, the percentage cover of the 7210 habitat within the polygons had been recorded. For Long et al. (2018) and Smith & D'Arcy (2020), the percentage cover of the 7210 habitat within polygons was assessed with remote imagery, or a median percentage cover of 20% 7210 per polygon was applied based on the NPWS National Fen Survey 2021 to 2023 data. Following a similar approach to Long et al. (2018), a median area of 1,486 m², calculated based on the 7210 polygons surveyed during the NPWS</td></tr>
</table>

	National Fen Survey 2021 to 2023, was applied to each unique point that had not been superseded by more recent data. Data sources listed in section 3.4 that recorded the 7210 habitat were assigned a level of certainty: 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based brief field observations, 1 = low certainty often data that have not been validated in the field (e.g. based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to calculate the area of the 7210 habitat. The significant difference between the habitat extent recorded during the current reporting period and the last (NPWS, 2019) is primarily due to more accurate data, with the first national survey for the 7210 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. The current minimum area of 5.24 km² reported in section 5.2 is significantly smaller than the best estimate area of 69.71 km^2 reported in NPWS (2019), while the current maximum area of 30.33 km^2 is also less than the NPWS (2019) best estimate area. This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7210 area in the NPWS (2019) area calculation, such as the 3.5 km² Garriskil Bog SAC (000679) and 4.7 km² Mount Hevey Bog (002342) and 2 km² Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7210 overlapped by 34.85 km^2 and the habitat polygons of 7230 and 7210 overlapped by 36.29 km^2. Reviewing these polygons and applying more appropriate estimates for the 7210 habitat is a significant cause of the drop in 7210 area from the 2019 best estimate of 69.71 km² to a current maximum estimate of 30.33 km^2. Apparent loss of 7210 habitat also relates to the updating of the definition of the habitat by Long *et al*. (2018) and O'Neill *et al*. (2021), which limits the habitat to *Cladium mariscus* in a mosaic with, or in monodominant stands adjacent to, 7230, 7140, 6410 or 6430, with a cover of >25%. The NPWS National Fen Survey 2021 to 2023 visited 75 sites where an area of 7210 habitat was mapped and this representative dataset was used to investigate area loss. In the absence of baseline mapping with which to compare the current reported extent of the 7210 habitat, remote imagery was used. The earliest available high resolution colour aerial imagery that could be used to assess loss in 7210 habitat against the NPWS National Fen Survey 2021 to 2023 data was produced in 2000 and 2005, with periodic releases of more up-to-date imagery from 2005 to the present. After comparing the National Fen Survey mapping with the 2000 to 2005 remote imagery, habitat loss was recorded at five of the 75 7210 sites. Four of these losses occurred during the last two reporting periods. At two of the five sites, the loss was due to conversion into agricultural land, at two other sites the loss

	was due to drainage/water abstraction, while at the last site, loss was attributed to road construction (N85 Ennis Western Relief Road). Across the 75 7210 sites, the total recorded area of 7210 lost due to impacts over the last two reporting periods was 0.3 ha or 0.12% of the total area of 7210 at these 75 sites. In addition to the losses reported during the National Fen Survey, 0.8 ha of 7210 habitat has been reported as lost by NPWS regional staff from an unnamed SAC. Short-term trend in Area was deemed to be *decreasing* because the area of 7210 has reduced across four of the surveyed sites during the last two reporting periods due to anthropogenic factors. It should be noted that, based on similar surveys of other Annex I habitats in Ireland, the methodology of estimating area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin *et al*., 2018). The Favourable Reference Area (FRA) was calculated with reference to O'Connell *et al*. (2021) and their analysis of Hammond (1979) and the reported decline in the area of fen habitats over the last 42 years. These data informed a reference-based approach, with information of moderate quality (i.e. good data on current area/distribution and ecological requirements but limited historical area/distribution data) used to inform expert opinion. On a county level the data presented in O'Connell *et al*. (2021) is highly variable, with some counties showing an increase in fen habitats, probably due to under-recording in some counties by Hammond (1979), while others have a significant decline. Nationally O'Connell *et al*. (2021) reported a decline of 78.8% in the area of fen habitat (there was an estimated 92,508 ha fen in 1979, with 19,593 ha remaining in 2021). Assuming that the rate of loss of 1,736 ha per annum ((92,508-19,593)/42 years) has been relatively constant (i.e. a linear relationship) over the last 42 years (Ridding *et al*. (2020) reported that fen, marsh and swamp habitats were the only semi-natural habitats in Dorset to decline linearly between 1930 and 2015), this would mean that the area of fen in 1994 (when the EU Habitats Directive came into force in Ireland) was 64,731 ha and 30.3% (19,593 ha) of the fen habitat present in 1994 remained in 2020, as reported by O'Connell *et al*. (2021). This significant decline will have resulted in the loss of fen habitat and the fragmentation of what remains. Assuming that the 7210 habitat has had a similar level of decline as fen habitats in general, the current minimum area of 5.24 km² is estimated to be 69.7% (i.e. between 51% and 100%) smaller than the FRA. It is also assumed that the significantly larger area of 7210 present in 1994 represents an FRA that would allow for the favourable conservation status of the habitat. Based on O'Connell *et al*. (2021) the long-term trend for the 7210 area since 1994 is a loss in area at a rate of -2.7% per annum (-69.7%/26 years).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***3.70 km²***
		Maximum	***21.38 km²***
	b) Area in not-good condition	**Minimum**	***1.54 km²***
		Maximum	***8.94 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO*		
6.7 Typical species Method used *Optional*	The methodology has changed as assessment criteria for the 7210 habitat were developed as part of the NPWS Pilot and National Fen Survey. As part of these criteria, the cover of *Cladium mariscus* must be ≥25% and the number of other positive vascular plant indicator species ≥3 (not applicable for dense primary stands of *Cladium mariscus*) for an assessment stop to pass the Structure and functions assessment. The list of typical species used for the assessment criteria are: *Angelica sylvestris, Caltha palustris, Carex panicea, Carex demissa, Carex dioica, Carex lasiocarpa, Carex lepidocarpa, Carex rostrata, Cirsium dissectum, Cladium mariscus, Comarum palustre, Eleocharis quinqueflora, Equisetum fluviatile, Filipendula ulmaria, Juncus bulbosus, Lysimachia tenella, Lysimachia vulgaris, Lythrum salicaria, Menyanthes trifoliata, Molinia caerulea, Pinguicula vulgaris, Schoenus nigricans, Selaginella selaginoides, Valeriana officinalis.* A broader list of plant species that are associated with the 7210 habitat was reported in NPWS (2019).		

6.8 Additional information *Optional*	The area of 7210 habitat in good condition was calculated for 72 sites surveyed as part of the NPWS National Fen Survey 2021 to 2023 and O'Neill *et al*. (2021). The number of sites where Structure and functions were assessed was less than the 75 sites surveyed because at three sites only small areas of 7210 habitat were recorded. The calculation was based on the percentage of monitoring stops at each site that were assessed to have favourable Structure and functions. As the sample of 72 sites is considered representative of the national resource, the proportion of areas in good and not-good condition were scaled up to estimate the national area. The percentage of the 7210 habitat in good condition has significantly decreased from 80% estimated in the last reporting period (NPWS, 2019) to 70.52% in the current reporting period. The short-term trend for the habitat is *uncertain* as the dataset used to report the 80% habitat in good condition is NPWS (2019) was limited.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	High
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	High
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	High
PA06 Mowing or cutting of grasslands	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	Low
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Low
PB26 Other forestry activities, excluding those relating to agro-forestry	Ongoing and likely to be in the future	Minority <50%	Low

PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low
PI01 Invasive alien species of Union concern	Only in the future		

e) Invasive alien species of Union concern	*Heracleum mantegazzianum* (R07248) is found adjacent to one 7210 site and is expected to be a pressure in the future.
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures were recorded during field surveys for the NPWS National Fen Survey 2021 to 2023.
7.4 Additional information *Optional*	The NPWS National Fen Survey 2021 to 2023 visited 75 sites where an area of 7210 habitat was mapped and pressures were recorded. The 14 pressures listed in section 7.2a are all negative pressures that were recorded as impacting the 7210 habitat or considered to impact the habitat in the future. The timing presented in section 7b was decided based on if the pressure was currently impacting the habitat and if, based on expert judgement, it would continue to impact in the future. One pressure was recorded adjacent to the 7210 habitat but is expected to become an impact in the future. The scope for each pressure (section 7c) was calculated based on the area each pressure impacted nationally as a percentage of the total area of 7210 surveyed. The influence for each pressure was assigned at an individual site level and the data presented in section 7.2d is the influence level that was recorded across the greatest area of 7210 for each pressure. It should be noted that, during the National Fen Survey 2021 to 2023, negative pressures were recorded as impacting 51% of the 7210 habitat area. The pressures in the standard list of EU pressures are open to some interpretation; for nine of the 14 pressures listed in section 7a the description accurately reflects the data recorded, but for five pressures further explanation is needed. PI03 was used by the National Fen Survey to record problematic native species in the form of scrub encroachment. For PA17 and PB19 the evidence for pollution/nutrient enrichment was often the presence of green slime/algae on plants, substrates or in the water. PB26 was recorded once by the National Fen Survey where conifers were self-seeding into the fen. PF05 was recorded three times for trampling by fishermen and swimmers and for the impact of a boardwalk and adjacent walking trails.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* *c) **Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	During the NPWS National Fen Survey 2021 to 2023, conservation measures were recorded in the general site notes or as positive pressures, such as appropriate grazing with stock (conservation measure MA03), or appropriate grazing by wild deer (conservation measure MM01). In addition to site-specific conservation measures, common high influence negative pressures on the 7210 habitat, such as PA05 'Abandonment of management', PA17 'Agricultural activities generating pollution to surface or ground waters', and PL02 'Drainage', are sometimes addressed on a broader scale by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g. Carra LIFE), the Department of Agriculture's ACRES agri-environment scheme, or national initiatives such as the Environmental Protection Agency enforcing water quality standards. With 29.48% of the 7210 area surveyed during the current reporting period in unfavourable ('not-good') condition, there is a need for conservation measures, such as drain blocking, to be applied across a significant area of the habitat. However, based on the data collected during the NPWS National Fen Survey there is little evidence to suggest that conservation measures are being implemented on an appropriate scale to maintain the current area, or structure and functions of the 7210 habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The future trend for the Range parameter is assessed as *stable*, with the negative influence of the reported threats balanced against conservation measures judged to have no significant impact on the overall range of the 7210 habitat over the next 12 years. As the current status of the parameter is *Favourable* and the future trend is assessed as *stable* the Future prospects for Range are *Good*. The future trend of Area is assessed as *negative* based on the negative influence of the reported threats balanced against conservation measures. Only a small loss of area (0.3 ha or 0.12% of the total NPWS National Fen Survey area) was recorded during the NPWS National Fen Survey, but based on similar surveys of other Annex I habitats in Ireland, the methodology of recording area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin et al., 2018). Therefore, based on expert judgement the current status of the Area	

	parameter is assessed as *Unfavourable-Bad* and together with a *negative* trend this results in *Bad* Future prospects. The current status of the Structure and functions parameter is assessed as *Unfavourable-Bad*, because <75% of the 7210 area assessed during the current reporting period is in good condition. Based on an assessment of the negative influence of the reported threats balanced against conservation measures, the future trend is assessed as *negative* and the Future prospects of Structure and functions are *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable*** *(FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	***c) yes, due to improved knowledge/more accurate data***
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change /* ***improved knowledge or more accurate data*** */ the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change /* ***improved knowledge or more accurate data*** */ the use of a different method /unknown/ other reasons*

10.8 Additional information *Optional*	For the parameter of Range the status is assessed as *Favourable* as the range surface area is not smaller than the Favourable Reference Range and the short-term trend is *stable*. For the parameter of Area the status is assessed as *Unfavourable-Bad* as the current area is more than 10% below the Favourable Reference Area. The status of the Structure and functions parameter is *Unfavourable-Bad* because "more than 25% of the area is unfavourable as regards its specific structure and functions" (Anon., 2022). The status of Future prospects is also *Unfavourable-Bad* due to the fact that Structure and functions have *Bad* Future prospects. As three of the parameters have a status of *Unfavourable-Bad*, the Overall Conservation Status assessment is also *Unfavourable-Bad*. For the parameters Area and Structure and functions, the future trend is assessed as *negative* based on the negative influence of the reported threats balanced against conservation measures. Therefore, the overall trend in Conservation Status is *deteriorating* as only the parameter of Range is judged to be *stable*.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	***2.60 km²***
	b) Maximum	***27.21 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

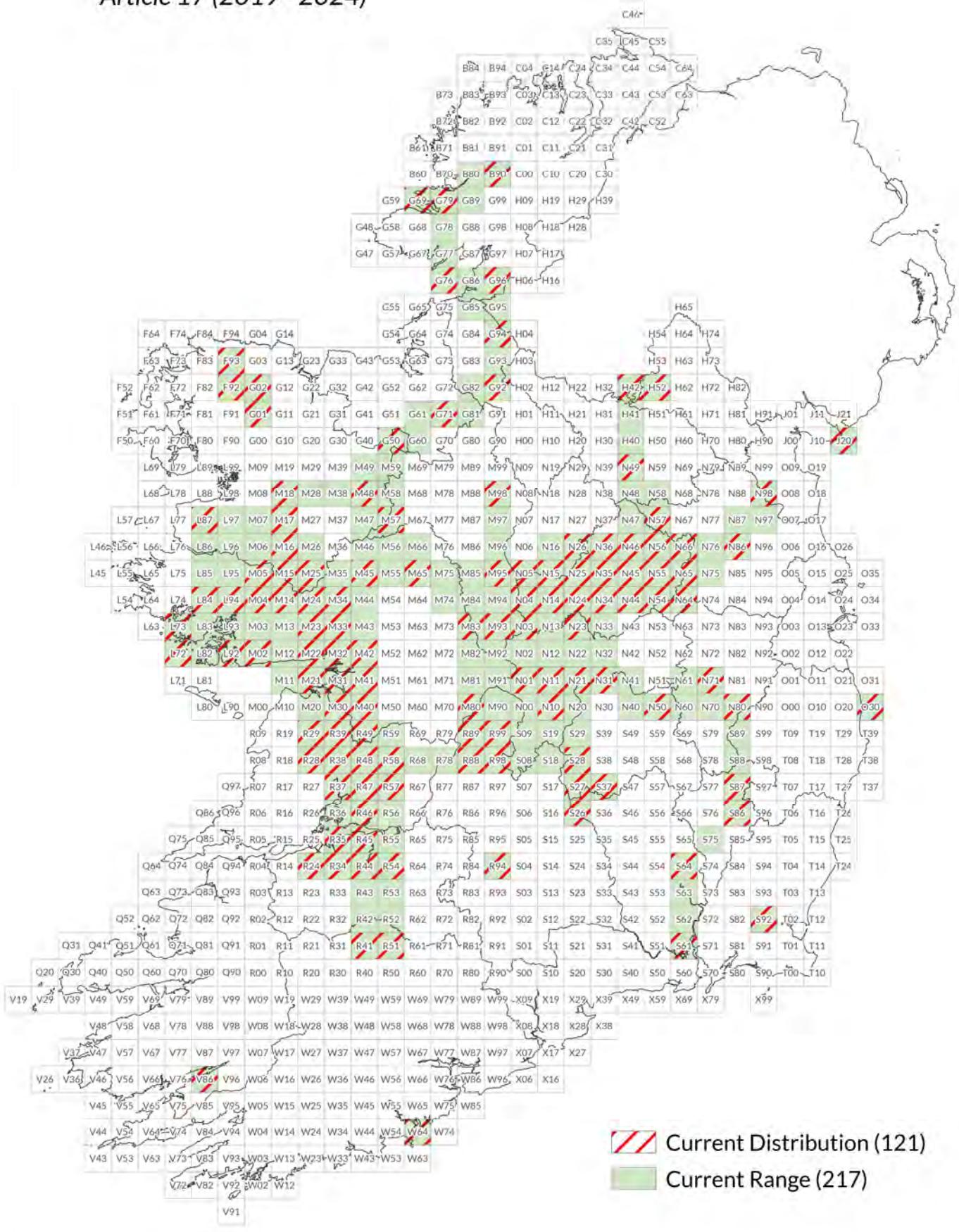
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the Natura 2000 network and associated trends were estimated by performing a union between the 7210 polygon shapefile and the SAC shapefile and an intersect between the 7210 point shapefile and the SAC shapefile. The areas given in section 11.1 are the minimum and maximum total area of the 7210 habitat in SACs in the country, including some SACs where the habitat is not listed as a qualifying interest (QI). The area of 7210 within the Natura 2000 network where it is listed as a QI ranges from 2.22 km² to 13.20 km^2. The accuracy of these area values will be affected by the point shapefile. This is due to the fact that a point may fall within an SAC, but relate to an area partly or entirely outside the SAC network, and vice versa. The significant difference between the habitat extent recorded within SACs during the current reporting period and the last (NPWS 2019) is primarily due to more accurate data, with the first national survey for the 7210 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. The current area range of 2.60-27.21 km^2 reported in section 11.1 is smaller than the best estimate of 40.72 km², reported in NPWS (2019). This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7210 area in the NPWS (2019) area calculation, such as the 3.5 km² Garriskil Bog SAC (000679) and 4.7 km² Mount Hevey Bog (002342) and 2 km² Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7210 overlapped by 34.85 km^2 and the habitat polygons of 7230 and 7210 overlapped by 36.29 km^2. Reviewing these polygons and applying more appropriate estimates for the 7210 habitat is a significant cause of the drop in 7210 area found within SACs.

	Apparent loss of 7210 habitat also relates to the updating of the definition of the habitat by Long *et al*. (2018) and O'Neill *et al*. (2021), which limits the habitat to *Cladium mariscus* in a mosaic with, or in monodominant stands adjacent to, 7230, 7140, 6410 or 6430, with a cover of >25%. There was a recorded nett loss of 1.02 ha of 7210 habitat from SACs over the last two reporting periods, with the remaining 0.08 ha lost from outside SACs. Of the SACs where 7210 habitat is listed as a QI, there was also a net loss of 1.02 ha as the 7210 habitat is a QI for the SACs where the habitat was lost. The short-term trend of the habitat area within the SAC network is taken to be *decreasing*, the same trend as the habitat nationally. There were small recorded area losses over the last 12 years which are considered to be an underestimate of overall losses over the period. The current reporting period is the first time that accurate data have been recorded for this Annex I habitat on a national scale. The short-term trend for the Structure and functions for the habitat within the SAC network is *uncertain*, the same trend as the habitat nationally, as the dataset used to report the percentage of habitat in good condition in NPWS (2019) was limited. As already stated, the current reporting period is the first time that accurate data have been recorded for this Annex I habitat on a national scale.

12 Complementary information *N/A*

Cladium fens* (7210)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**7220 Petrifying springs with tufa formation (*Cratoneurion*)***
1.2i Habitat short name	**Petrifying springs**
1.3i Habitat description	Petrifying springs are a specialised habitat that forms where calcareous waters deposit tufa (a porous rock made of calcium carbonate). The tufa formation may be small deposits around the bases of plants within the spring, or can comprise very large mounds and cascades. The resulting ecological conditions, with high pH and constant inundation by water and deposition of precipitated calcium carbonate, constitute a challenging environment for plants and animals to colonise, and the communities associated with petrifying springs are therefore highly specialised (Lyons & Kelly, 2016). Springheads may be distinct point locations giving rise to small streams immediately below the point of emergence, or water may seep to the surface in a more diffuse pattern over a larger area (Lyons & Kelly, 2016.) Petrifying springs can occur in semi-natural habitats such as seepages on coastal cliffs, springs in upland fens and wooded springs, but are also found in artificial habitats such as quarries, water troughs, seepages on walls and in roadside ditches (Denyer *et al*., 2023). Irish petrifying springs are usually dominated by bryophytes (mosses and liverworts). They have been classified into eight plant communities (Lyons & Kelly, 2016). These groups encompass a broad range of variation within petrifying springs and include lowland, upland, wooded, unwooded and coastal springs. Ecologically significant species of petrifying springs, which serve as positive indicators of habitat status, consist largely of mosses and liverworts (bryophytes), with a smaller number of vascular plants. These include *Aneura pinguis, Bryum pseudotriquetrum, Campylium stellatum, Didymodon tophaceus, Eucladium verticillatum, Fissidens adianthoides, Fissidens crassipes/F. rufulus, Hymenostylium recurvirostrum* var. *recurvirostrum, Jungermannia atrovirens, Mesoptychia turbinata, Palustriella commutata, Palustriella falcata, Pellia endiviifolia, Philonotis calcarea, Plagiomnium elatum, Scorpidium cossonii* and *Scorpidium scorpioides* (bryophytes); *Carex hostiana, Carex lepidocarpa, Carex panicea, Chrysosplenium oppositifolium, Crepis paludosa, Eleocharis quinqueflora, Equisetum telmateia, Equisetum variegatum, Eriophorum latifolium, Festuca rubra, Lysimachia tenella, Parnassia palustris, Pinguicula vulgaris, Selaginella selaginoides* and *Schoenus nigricans* (vascular plants); and, *Chara vulgaris* (algae) (Denyer *et al*., 2023). High-quality positive indicator species for *7220 are *Saxifraga aizoides, Mesoptychia bantriensis, Moerckia flotoviana, Catoscopium nigritum, Hymenostylium recurvirostrum* var. *insigne, Orthothecium rufescens, Seligeria oelandica, Seligeria patula* and *Tomentypnum nitens* (Denyer et al., 2023). These are largely restricted to western

	springs, particularly in the Ben Bulben, Gleniff and Glenade Complex SAC.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	A baseline national field survey of petrifying springs was carried out by Melinda Lyons as part of her PhD (Lyons, 2015) and she compiled the 2013 National Conservation Assessment for this habitat (Lyons & Kelly, 2013; NPWS, 2013). For the 2019 assessment (NPWS, 2019), a range of further datasets and reports were reviewed, as listed in Denyer & Long (2018). In addition, ecologists were contacted leading to the subsequent inclusion of multiple sites known to ecologists but not previously included in assessments. The distribution map presented here is based on the point data from the 2019 assessment, augmented with data which have been collected in the interim. These data come from a variety of sources, including the National Petrifying Springs Survey 2023 of 24 petrifying spring sites; National Fen Survey; 30 petrifying spring reports, two datasets and 17 ecologists (Denyer, 2024). Once all the data were collated, a thorough review of points was carried out (Denyer 2024). Multiple sources of information were used to form an opinion on a particular feature. Decisions were made on whether to remove, add, or update features where new information had become available or where there was replication of information. The 2019 assessment included a total of 433 mappable points relating to petrifying springs in Ireland. In the current review, 33 points were removed and replaced with updated points, one point was removed as it could not be re-located in the field and one duplicate point was removed. In total, 89 points were updated with additional information, such as more precise grid references and area calculation. Six points which had been removed in the 2019 assessment were reinstated based on new information (such as field data). A total of 237 new spring points were added to the database. Full details of the data review can be found in Denyer (2024).

	During the 2023 monitoring project, all points were assigned a confidence level as follows: A: point/polygon known to be Annex I Petrifying Spring, surveyed by petrifying springs ecologist. B: point/polygon probably represents Annex I Petrifying Spring, information inferred from data such as habitat-specific bryophyte records, use of Fossitt (2000) habitat classification category FP1, photographs, or survey by general field ecologist. C: point/polygon possibly represents Annex I Petrifying Spring, information available suggests this but is not conclusive (e.g. tufa mentioned, but no species information provided). These petrifying springs are retained within the database, but not mapped or used for area calculations, due to lack of information. This results in 679 mappable points, from 190 sites, relating to petrifying springs in Ireland with 604 points of confidence level A and 75 of level B.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic,*** *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Additional data sources and reports which were reviewed for the current assessment are listed in the backing document (Denyer, 2024).
3.4 Sources of information	Commission of the European Communities (2013) Interpretation manual of European Union habitats: EUR 28. Brussels: European Commission DG Environment. Denyer, J. (2025) Monitoring and Assessment of EU Habitats Directive Annex I Priority Habitat Petrifying Springs, 2025. *Irish Wildlife Manuals*, No. 160. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Denyer, J. (2024) Backing document – National Conservation Status Assessments (NCAs) for Petrifying Springs with Tufa Formation (Cratoneurion) (7220). Unpublished report to NPWS. Denyer, J., Eakin, M. & Gill, M. (2023) Guidelines for the Assessment of Annex I Priority Petrifying Springs in Ireland. *Irish Wildlife Manuals*, No. 142. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Denyer, J. & Long, M.P., (2018) Backing document – National Conservation Status Assessments (NCAs) for Petrifying Springs with Tufa Formation (Cratoneurion) (7220). Unpublished report to NPWS.

	DG Environment (2023) Reporting under Article 17 of the Habitats Directive: Guidelines on concepts and definitions – Article 17 of Directive 92/43/EEC, Reporting period 2019-2024. Brussels. Pp 104. EU Collated typical species. List of typical species reporting by the Member States as a part of the 2007-2012 & 2019-2024 Article 17 reports. Lyons, M.D. & Kelly, D.L. (2017) Plant community ecology of petrifying springs (Cratoneurion) – a priority habitat. *Phytocoenologia,* 47(1), 13–32. Lyons, M.D. & Kelly, D.L. (2016) Monitoring guidelines for the assessment of petrifying springs in Ireland. *Irish Wildlife Manuals*, No. 94. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Ireland. Lyons, M.D. (2015) The flora and conservation status of petrifying springs in Ireland. Ph.D. Thesis, Trinity College Dublin. Lyons, M.D. and Kelly, D.L. (2013) Conservation Status Assessment for Petrifying Springs – backing document. Unpublished report to NPWS. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Species Assessments Volume 3. Version 1.0. Unpublished NPWS report.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***21,800 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*

4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 21,800 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	

	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* ***high****/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of 7220. See field 2.5 and Denyer (2024) for details of the methods used to determine the current known distribution. Short-term trend direction was estimated as *stable* based on a comparison of data from the previous and current reporting period. The current range is 218 10x10 km grid cells. This is an apparent increase in range, both in the short-term (189 grid cells recorded in 2019) and long-term (132 grid cells recorded in 2013). However, this is due to improved knowledge and the addition of 238 new spring points in the current assessment. For instance, several new petrifying spring sites were recorded in the south-east of Ireland where there were previously no springs recorded. While there have been some small losses of habitat area within the reporting period, these are small in comparison to the overall range size, and this is an uncommon but relatively widespread habitat type in Ireland. These factors combined suggest that the range is unlikely to be affected by such losses and the trend is reported as *stable*. The Favourable Reference Range (FRR) has been set as equal to the current range as it is based on more complete data being available on the distribution of petrifying springs across Ireland than was available in the last monitoring round. The FRR is considered to encompass all ecological and geographical variation of the habitat and is likely to be sufficiently large to allow the long-term viability of the habitat.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2007-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.180279 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	

5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>5.12 Long-term trend Direction

Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend Magnitude

Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend Method used

Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
<u>high</u>/moderate/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">0.180 km²</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">In the 2019 reporting round, 43 springs had no area assigned. To calculate the total area for the habitat, a subset of those points/polygons with known areas was used to help generate a median area (with confidence intervals) for those points with unknown area (via multiple imputation method; see Denyer & Long, 2018, for further details). In the 2024 data review, additional data such as survey mapping, site notes and photography were used to estimate an area for all 678 points in the database (Denyer, 2024).</td></tr>
</table>

	The short-term trend direction was estimated as *stable* based on field survey data. Data sources show that there have been small losses at a few sites, but mostly the changes relate to condition rather than loss of area. There was a short-term increase of 16.5-28.8% in petrifying springs habitat area. This is due to new information being available, with updated areas for many existing springs and the addition of 238 new spring points to the database. Although some small losses of habitat area have occurred since the Directive came into force, and during the current reporting period, the magnitude of the decline is small. It is unlikely that >10% of the resource has been lost since 1994. Most changes are due to condition, rather than area. Thus, the Favourable Reference Area is set as the area in the 2013 reporting round, which was the first field-based area measurement of this habitat.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.1388 km²***
		Maximum	***0.1388 km²***
	b) Area in not-good condition	**Minimum**	***0.0415 km²***
		Maximum	***0.0415 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? **YES**/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*
6.7 Typical species Method used *Optional*	The list of high quality and positive indicator species (bryophytes, vascular plants and charophytes) for this habitat has been updated (refer to Denyer *et. al*., 2023, for details). These indicator species are used to assess whether petrifying spring habitat is in favourable condition and to rank springs nationally according to their conservation value. The updated list was based on a review of survey data since the last list was compiled and includes recent nomenclature changes. There are 9 high quality indicator species and 33 positive indicator species on the updated list. The list of species is as follows: *Aneura pinguis; Bryum pseudotriquetrum; Campylium stellatum; Carex hostiana; Carex lepidocarpa; Carex panicea; Catoscopium nigritum; Chara vulgaris; Chrysosplenium oppositifolium; Crepis paludosa; Didymodon tophaceus; Eleocharis quinqueflora; Equisetum telmateia; Equisetum variegatum; Eriophorum latifolium; Eucladium verticillatum; Festuca rubra; Fissidens adianthoides; Fissidens crassipes/F. rufulus; Hymenostylium recurvirostrum var. insigne; Hymenostylium recurvirostrum var. recurvirostrum; Jungermannia atrovirens; Lysimachia tenella; Mesoptychia bantriensis; Mesoptychia turbinata; Moerckia flotoviana; Orthothecium rufescens; Palustriella commutata; Palustriella falcata; Parnassia palustris; Pellia endiviifolia; Philonotis calcarea; Pinguicula vulgaris; Plagiomnium elatum; Saxifraga aizoides; Schoenus nigricans; Scorpidium cossonii; Scorpidium scorpioides; Selaginella selaginoides; Seligeria oelandica; Seligeria patula; Tomentypnum nitens.*
6.8 Additional information *Optional*	Structure and functions data were available for 24 sites from the National Petrifying Springs Survey 2023, with a combined area of 0.0794 km^2 of petrifying spring habitat. See Denyer (2024) for more details. Additional data on structure and functions from relevant reports and datasets were available for a further 18 sites, with a combined area of 0.0023 km^2 of petrifying spring habitat (Denyer, 2024). In total, structure and functions data were available from 42 sites, which is 22.11% of known petrifying spring sites, and from 0.0817 km^2, which is 45.35% of known petrifying spring area. In the petrifying spring areas for which structure and functions data are available for the reporting period, these were *Favourable* in 0.0629 km^2 (76.99%); *Unfavourable-Inadequate* in 0.0145 km^2 (17.75%); and *Unfavourable-Bad* in 0.0043 km^2 (5.62%). The structure and functions data were collected from a representative sample of petrifying springs in Ireland. It includes data from small and large spring complexes; urban and non-urban areas; covers a wide geographic spread; includes springs of low to very high conservation status; and includes examples of all Irish petrifying spring vegetation communities (Lyons & Kelly, 2017). Therefore, the results can be applied to the total known petrifying spring habitat, giving a total of

	0.1388 km^2 in *Favourable* (good) condition (76.99%) and 0.04153 km^2 in *Unfavourable* (not-good) condition (23.01%). Detailed information on what constitutes good condition for petrifying springs in Ireland is included in Denyer *et. al.* (2023) and Lyons & Kelly (2016). In the 2019 National Conservation Assessment for this habitat, the proportion of habitat in good condition was reported as 75% so there is an apparent 1.95% increase in area in good condition in the current assessment. However, there was no corresponding increase in reported site condition compared to 2019. It is therefore considered that the apparent increase is due to more accurate assessment of spring areas in the current assessment. Short-term trend direction was assessed as *stable*. Where data were available from 2013-2024, 0.45% of the area had a *decreasing* trend in Structure and functions. There are ongoing issues and pressures at many spring sites, particularly in the east of the range. However, only a small number of these sites are continuing to decline in condition and so overall there is currently a *stable* short-term trend in Structure and functions.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PK01 Mixed source pollution to surface and ground waters (limnic and terrestrial)	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Medium
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PM05 Avalanches, landslides and collapse of terrain	Ongoing and likely to be in the future	Minority <50%	Low
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low

PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PA25 Agriculture activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Medium
PE05 Land, water and air transport activities generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium
PL01 Abstraction from groundwater, surface water or mixed water (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PF07 Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Minority <50%	Medium

e) Invasive alien species of Union concern	*Heracleum mantegazzianum* – 1 site
f) Other invasive alien species *Optional*	*Soleirolia soleirolii* – 1 site *Petasites pyrenaicus* – 2 sites *Cotoneaster* sp. – 3 sites *Epilobium brunnescens* – 1 site *Fagus sylvatica* – 1 site
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Threats and pressures data were available for 24 sites from the National Petrifying Springs Survey 2023. Additional data on threats and pressures from relevant reports and datasets were available for a further 51 sites (Denyer, 2024). In total, threats and pressures data were available from 75 sites, which is 39.46% of known petrifying spring sites; and from 0.1557 km^2, which is 87.63% of known petrifying spring area. 7.1a - A total of 31 pressures and threats were recorded. These were ranked according to the number of sites they impacted. All impacts which were recorded at more than three sites were selected for inclusion here. In addition, all impacts which had a medium or high recorded impact affecting at least one site (ongoing) were included. This produced a list of 16 impacts. These are listed in order of the number of sites impacted (in descending order) in field 7.1a. 7.1b - All listed pressures are recorded as 'ongoing and likely to be in the future'.

	7.1c – The scope of the pressures was recorded for each site which had threats and pressures data available. This was recorded as <50%, 50-90% and >90%. In order to assess the overall scope of each pressure across all springs, the scope per area needed to be calculated. The categories were converted to a percentage <50% = 25%, 50-90% = 75% and >90% = 95%. The area of each site impacted by the pressure could then be estimated and combined to give an overall area for all sites assessed. As stated in field 6.8, the threats and pressures data were collected from a representative sample of petrifying springs in Ireland and therefore can be applied to the total known petrifying spring habitat. 7.1d – For each pressure, the most frequently reported influence, i.e. recorded at the most number of sites, was selected. However, where the most reported influence was 'low' but there was a high influence reported from at least one site, expert judgement was used to decide the overall influence level. Where there was an equal number of sites, e.g. two sites with 'low' and two sites with 'medium', the higher influence category was listed. If the combined number of sites with 'low' was equal to those with 'medium' and 'high', e.g. two sites with 'low', one site 'medium' and one site 'high', then 'low' was not used and expert judgement was used to decide the overall influence level. 7.1e – Invasive species of Union concern was not listed as a key pressure in 7.1a as it only affects one site. It is included here for information.
7.4 Additional information *Optional*	The key pressures in the current assessment relate to water quality and changes to hydrology. PK01 (mixed source pollution to groundwater) is the highest ranked impact, recorded at 15 sites. In addition, PA17 (agricultural pollution to groundwater), PF07 (residential and commercial pollution to ground water), PE05 (transport activities generating pollution to ground water), PL01 (groundwater abstraction), PL02 (drainage) and PL05 (modification of hydrological flow) are listed in the top 16 key pressures (Denyer, 2024). The second key pressure is PA05 (abandonment of management) which was recorded at 12 sites. This can lead to springs becoming overgrown with tall vegetation or scrub and drying out. Conversely, over-grazing with associated trampling and dung was impacting some sites, either by intensive agricultural grazing (PA07) or deer (PI03). Other impacts include the loss of springs, disturbance or other impacts from adjacent urbanisation (PF01) and recreational activities (PF05), invasive species (PI02) and dumping of waste (PF06). The category PA25 refers to damage to springs by use of agricultural vehicles (such as quad bikes) in and adjacent to petrifying spring habitat. Eight sites are subject to natural landslides; these were usually coastal or in river valleys. Note that while all pressures affected a minority of the total petrifying springs area (<50%), the scope may be much higher at individual sites. For example, PA05, PA08, PA17, PE06, PF01 and PK01 were recorded as impacting over >90% of petrifying spring habitat in at least one site.

	In 2019, several pressures were listed as having high importance. In the current assessment, none are listed as having high influence. This is due to a difference in the data analysis. In the current assessment, the impact from a pressure on the total petrifying spring habitat was assessed. Therefore (as with scope), the influence may be much higher at individual sites. For example, PA05, PA07, PA17, PF01, PF06 and PL05 were recorded as having high negative influence on petrifying spring habitat in at least one site. In 2019, the highest impacting pressures were water pollution (J01) and abandonment (A06), which is the same as in the current assessment (PK01 and PA05). In the 2013 assessment, the highest impacting pressure was listed as 'landfill, land reclamation and drying out' (J02.01), but other important pressures included those relating to abandonment, water pollution and trampling/overuse/intensive grazing. Climate change has not been included as an impact as this is difficult to assess without detailed ongoing hydrogeological investigations. However, it is likely to affect this habitat in Ireland in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* ***b) Expand the current range of the habitat type (related to 'Range')*** *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MI03 Management, control or eradication of other invasive alien species MF04 Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	A number of conservation measures that had been undertaken were reported in the 2019 assessment (NPWS, 2019). The following are additional known conservation measures. – Scrub clearance (MM01), treatment of invasive species (MI03) and removal of garden waste (MF04) from spring mounds within Moy Estuary undertaken in 2022 and 2024. – Scrub clearance (MA04) from petrifying spring/stream near Timahoe, Co. Offaly undertaken in 2024. – Habitat management plan (MM01; MF04) in preparation for an area of habitat with petrifying springs within Rye Water Valley/Carton SAC. Other conservation measures that could be undertaken include: MK01 Reduce impact of mixed source pollution MF01 Managing the impacts of converting land for construction and development of infrastructure MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)

	MK02 Reduce impact of multi-purpose hydrological changes MI05 Management of problematic native species MA14 Other measures related to agricultural practices MB14 Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats) MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) MF09 Adapt the management of water abstraction for public supply and for industrial and commercial use to reduce negative impacts on habitats and species (incl. restoration of habitats) MG02 Management of hunting, recreational fishing, and the recreational or commercial harvesting or collection of plants and fungi (incl. restoration of habitats) MI02 Management, control or eradication of established invasive alien species of Union concern MK03 Restoration of habitats impacted by multi-purpose hydrological changes

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	The Future prospects for the Range and the Area of the habitat have both been assessed as *Good*, because, while there may continue to be some small losses of habitat area and/or habitat quality in the next 12 years, these are likely to be relatively small in comparison with the overall range and area, and so these parameters are unlikely to be affected by such losses/decreases in quality. The Future prospects for the Structure and functions are assessed as *Poor*. 17.41% of the area is in *Unfavourable* (not-good) condition (field 6.8), the pressures which are responsible for the unfavourable condition are all categorised as 'ongoing and likely to be in the future' (field 7.1b) and there are few conservation measures being undertaken (field 8.7).	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*

<table>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / <u>Inadequate (U1)</u> / Bad (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / deteriorating / <u>stable</u> / unknown</td></tr>
<tr><td rowspan="8">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td>a) No, there is no difference</td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td><u>c) yes, due to improved knowledge/more accurate data*</u></td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">Range: The reported range has increased compared to the 2019 assessment, but this is due to improved knowledge as new spring sites have been identified outside of the previously reported range. While there have been some losses of habitat within the reporting period, these are small, and as this is an uncommon but widespread habitat, the range has not been affected by such losses. Range was assessed as Favourable, with a stable trend.

Area: There was an increase in area compared to the 2019 assessment. This is due to new information being available, with updated areas for many existing springs and the addition of 238 new spring points to the database. There have been some small losses of habitat area, but the effect on overall area is small. Area was assessed as Favourable, with a stable trend.

Structure and functions: There was an increase in the habitat area in good condition compared to the 2019 assessment. However, there was no corresponding increase in reported site/spring condition compared to 2019. It is considered that the apparent increase is due to more accurate assessment of spring areas in the current assessment. In both reporting periods the percentage of habitat in good condition was less than 90% and so, as per EU Guidance (DG Environment, 2023) is classified as Unfavourable-Inadequate.

Overall, the conservation status has been assessed as Unfavourable-Inadequate with a stable trend.

*Note: There is an inconsistency between this and the option selected in the EEA's online Reportnet 3 system, in which "a) No, there is no difference" was incorrectly selected. Trend in 2019 was reported as</td></tr>
</table>

	deteriorating, trend in 2025 is stable. This change is due to improved knowledge/better data rather than actual change.

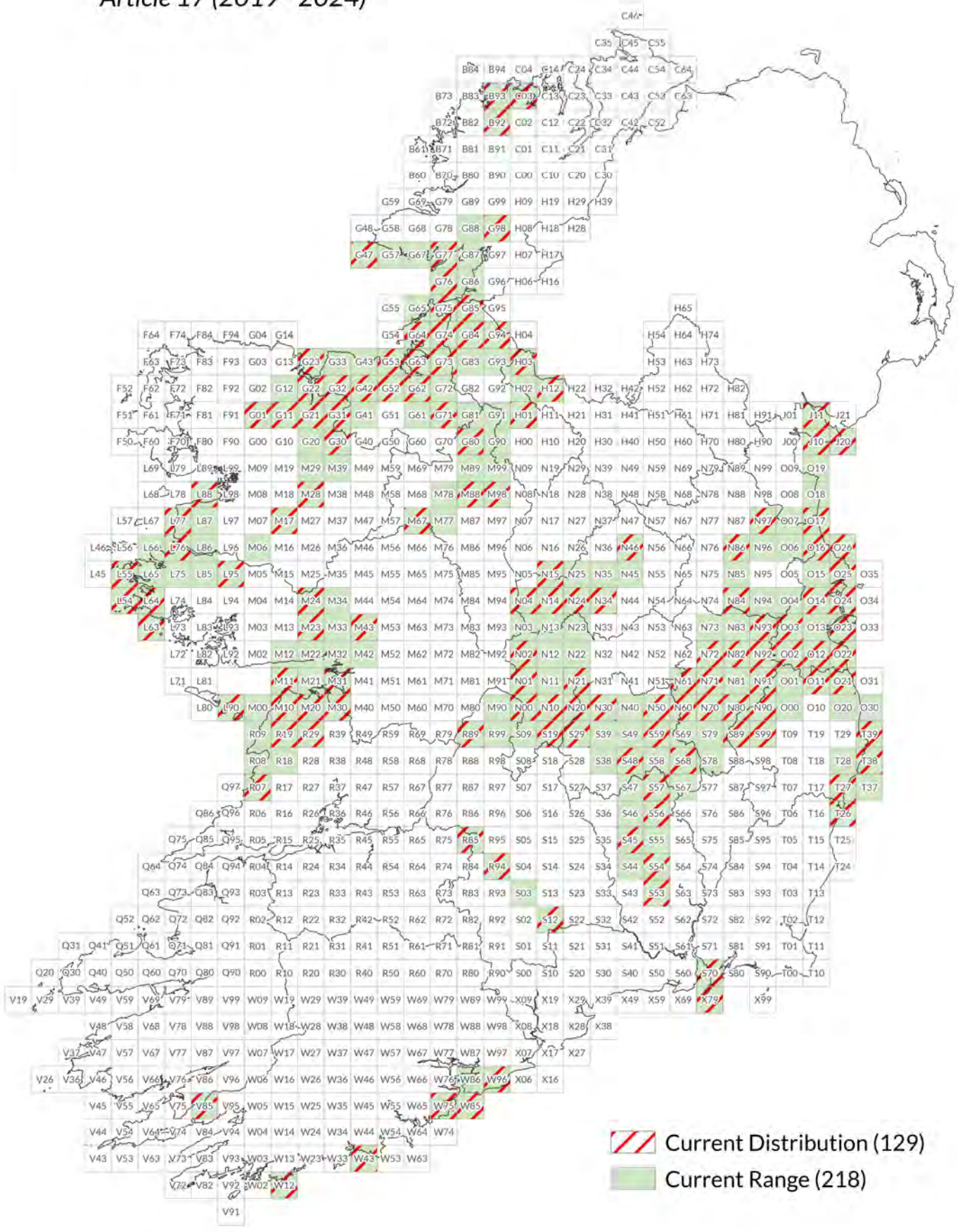
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.1308 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The area within the SAC network was determined by selecting all spring points that are located within the SAC shapefile. The SAC shapefile was buffered by 15 m, to ensure that points which have some error in the original mapped location, but are actually within the SAC network, were included. This was checked by selecting all points	

	which were labelled as being within an SAC in the point distribution database. Any discrepancies between the two datasets were checked manually (e.g. where a point was close to an SAC boundary, but clearly outside of the SAC as it is the other side of a river which is the SAC boundary). This gave a total of 406 spring points within the SAC network, all of which had an area assigned in the database which could be used to calculate the total spring area within SACs. In the 2019 assessment the area of petrifying spring habitat in the SAC network was 0.1308 km^2, compared with 0.1164 km^2 in the current assessment. This increase was due to new spring sites being recorded, both in SACs where 7220 was already recorded and in SACs where it was not previously recorded (new SAC sites). In the 2019 assessment there were 242 spring points within the SAC network. This was increased to 406 in the current assessment. This difference is due to more knowledge of spring distribution, not an actual increase. The short-term trend is therefore considered to be *stable*. A list of SACs which contain petrifying spring habitat, both QI (20 sites) and non-QI (29 sites), are given in Denyer (2024). The trend was estimated using data from the PTRS23 surveys (2023) and comparing them with data on SAC condition from Lyons (2015). Comparison data were available for 15 sites. One site had improved in condition and 14 sites were stable. Therefore, the trend was assigned as *stable* based on the available data.

12 Complementary information *N/A*

Petrifying springs* (7220)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**7230 Alkaline fens**
1.2i Habitat short name	**Alkaline fens**
1.3i Habitat description	Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high water table and a base-rich, often calcareous, water supply. Alkaline fens can develop in areas where vertical water movement predominates (topogenous), such as poorly drained basins or hollows and open water transitions; or where horizontal water movement is also important (soligenous), such as flushes, valley fens and the laggs of raised bogs. However, this distinction is not always clear (such as in large flood plain fens which can include both elements). Alkaline fens are relatively widespread in Ireland. The most extensive areas of alkaline fens occur in lowland basins associated with limestone groundwater bodies (most often in western and midland areas). Alkaline fens associated with flushes and open water transitions tend to be smaller, but may be more widespread than those in lowland basins. The 7230 habitat is comprised of a group of plant communities including FE1A *Schoenus nigricans – Campylium stellatum* fen, FE1B *Schoenus nigricans – Succisa pratensis* fen. FE1C *Carex panicea - Carex viridula* fen, FE2F *Menyanthes trifoliata – Calliergonella cuspidata* mire, FE3A *Carex nigra – Ranunculus flammula* fen (Perrin, 2024).

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2005-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map for the 7230 habitat in Ireland was developed from the polygons included in the 2013-2018 Article 17 distribution file (Long *et al.*, 2018), Galway County Council (2017), Smith & D'Arcy (2020), O'Neill *et al.* (2021), Crushell *et al.* (2022, 2023), Barron *et al.*

	(2022), Hodd *et al*. (2022a; 2022b), Smith *et al*. (2022), Hodd (2023), NPWS (2022), Crowley *et al.* (2023), Rigoni *et al*. (2023), Martin *et al*. (in prep.), NPWS Farm Plan Scheme 2019 to 2023 dataset and the NPWS National Fen Survey 2021 to 2023 dataset. In addition to the sources listed above, the distribution map utilised points digitised from the 2013-2018 Article 17 distribution file (Long *et al.*, 2018) and the NPWS *Vertigo* monitoring survey 2021 to 2024 (Brophy *et al.,* 2025). All polygons and points were included unless they were superseded by more recent data, or if a review with remote imagery showed that 7230 habitat was not present. Data sources listed in section 3.2 that recorded the 7230 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g. based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 7230 habitat. Additional relevant data sources gathered during the current reporting period were also reviewed but were not included in the distribution map as there were no 7230 data present. However, these data sources were useful in refining the previous distribution map (NPWS, 2019).

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Barron, S.J., Hodd, R.L. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. Brophy, J.T., Daly, O.H., Hamilton, J.J., O'Neill, F.H. & Martin, J.R. (2025) Monitoring of three Annex II species of *Vertigo* snail on Irish sites (2022–2024). *Irish Wildlife Manuals*, No. 159. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Crowley, W., Vanmechelen, A., O'Sullivan, J. Crushell, P., & Foss, P. (2023) County Mayo Wetlands Field Survey II 2023. Report prepared for Mayo County Council. Crushell, P., Kirwan, B. Crowley, W., Vanmechelen, A. & Foss, P. (2022) Title: County Laois Wetland Field Survey 2022. Report prepared for Laois County Council.

Crushell, P., Crowley, W., Vanmechelen, A., O'Sullivan, J. & Foss, P. J (2023) Title: County Leitrim Wetlands Field Survey II 2023. Report prepared for Leitrim County Council.

Galway County Council (2017) Unpublished data collected for the Galway City Transport Project.

Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, DHLGH, Dublin, Ireland.

Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland.

Hodd, R. (2023) Habitat and botanical survey of the Wild Atlantic Rainforest Knockaunbaun site, Maamturks, Co. Galway. Report to Hometree, Ennistymon, Co. Clare, Ireland.

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4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***51,000 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km² or*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 7230 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The range has changed from 48,800 km² (NPWS, 2019) to 51,000 km² due to more accurate data, with the first national survey for the 7230 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. This increase in range is due to 7230 habitat being recorded in 33 additional 10x10 km grid cells during the current reporting period. There are 13 grid cells where 7230 was previously recorded (NPWS, 2019), but a review of the current data sources (listed in section 3.4) found no evidence for the habitat. It was concluded that 7230 was previously recorded in error within these 10x10 km grid cells, rather than the habitat being lost, as no evidence	

	was found for significant change at each of these six sites since they were added to the 7230 distribution in 2013. The Favourable Reference Range (FRR) has been updated since the last reporting period (NPWS, 2019) due to improved knowledge. The NPWS National Fen Survey 2021 to 2023 visited 148 sites where an area of 7230 habitat was mapped. Although there was evidence of a reduction in the area of 7230 habitat at specific sites, due to factors such as conversion into agricultural land and drainage, there was no evidence of a reduction in the range of the habitat. O'Connell *et al*. (2021) and their analysis of Hammond (1979) showed that there has been a significant decline (78.8%) in the area of all fen habitats over the 42 years 1979-2020, inclusive. On a county level, the data in O'Connell *et al*. (2021) are highly variable, and no evidence is presented for a total loss of fen habitat from any one county. Therefore, although there is evidence of a significant reduction in the area of 7230, there is no evidence from these data of a significant decline in the range (i.e. the loss of 7230 from a county). Based on extrapolation from these data it is concluded that short-term and long-term trend for the Range parameter is *stable*. In order to provide more accurate data for assessing the status of the 7230 range, selected sites should be revisited during the next reporting period, in particular, sites visited during the NPWS National Fen Survey. The distribution map presented shows that the 7230 habitat is widespread, found in 25 of the 26 counties. Based on the available data, the current range for the 7230 habitat is thought to encompass the ecological and geographical variation of the habitat and is sufficiently large to ensure its long-term viability. The analysis of Hammond (1979) undertaken by O'Connell *et al*. (2021) shows there has been no significant reduction in the range (i.e. no loss of fen habitat from any one county). These data informed a reference-based approach, with information of moderate quality (i.e. good data on actual distribution and ecological requirements but limited historical distribution data) used to inform the expert opinion that the current range is approximately equal to the FRR.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2005-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	***17.78 km²***
	b) Maximum	***90.39 km²***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	

5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** ***d) yes, due to the use of different method*** *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***
5.9 Short-term trend Magnitude Type of estimate	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>5.12 Long-term trend Direction
Optional</td><td colspan="2">stable / increasing / <u>decreasing</u> / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend Method used
Optional</td><td colspan="2"></td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ <u>between 51% and 100% smaller than the FRA</u></td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderat</u>e/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information
Optional</td><td colspan="2">The area of 7230 habitat in Ireland was calculated using the polygons mapped in the 2013-2018 Article 17 distribution file (Galway County Council (2017), Long et al., (2018), Smith & D'Arcy (2020), O'Neill et al. (2021), Crushell et al. (2022), Barron et al. (2022), Hodd et al. (2022a; 2022b), Smith et al. (2022), Hodd (2023), NPWS (2022), Crowley et al. (2023), Crushell et al. (2023), Rigoni et al. (2023), Martin et al. (in prep.), NPWS Farm Plan Scheme 2019 to 2023 dataset and the NPWS National Fen Survey 2021 to 2023 dataset. In addition to the sources listed above, the area calculation also utilised points from the 2013-2018 Article 17 shapefile (Long et al., 2018) and the NPWS Vertigo monitoring survey 2021 to 2024. All polygons and points were included</td></tr>
</table>

	unless they were superseded by more recent data, or if a review using remote imagery showed that 7230 habitat was not present. For Galway County Council (2017), O'Neill *et al.* (2021), Barron *et al*. (2022), Hodd *et al*. (2022a; 2022b), Hodd (2023), NPWS (2022), Rigoni *et al*. (2023), Martin *et al*. (in press), and the NPWS National Fen Survey 2021 to 2023 data, the percentage cover of the 7230 habitat within the polygons had been recorded. For all other sources, the percentage cover of the 7230 habitat within polygons was assessed with remote imagery, or a median percentage cover of 25% 7230 per polygon was applied based on the NPWS National Fen Survey 2021 to 2023 data. Following a similar approach to Long *et al*. (2018), a median area of 1,892 m², calculated based on the 7230 polygons surveyed during the NPWS National Fen Survey 2021 to 2023, was applied to each unique point that had not been superseded by more recent data. A total of 435 National Survey of Upland Habitat points that were added to the 7230 dataset in 2013 retained their field-surveyed area rather than the standard median area. Data sources listed in section 3.4 that recorded the 7230 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g. based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to calculate the area of the 7230 habitat. The significant difference between the habitat extent recorded during the current reporting period and the last (NPWS, 2019) is primarily due to more accurate data, with the first national survey for the 7230 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. The current minimum area of 17.78 km² reported in section 5.2 is significantly smaller than the best estimate area of 125.31 km^2 reported in NPWS (2019), while the current maximum area of 90.39 km^2 is also smaller. This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7230 area in the NPWS (2019) area calculation, such as the 3.5 km² Garriskil Bog SAC (000679) and 4.7 km² Mount Hevey Bog (002342) and 2 km² Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7230 overlapped by 32.28 km^2 and the habitat polygons of 7230 and 7210 overlapped by 36.29 km^2. Reviewing these polygons and applying more appropriate estimates for the 7230 habitat is a significant cause of the drop in 7230 area from the 2019 best estimate of 125.31 km² to a current maximum estimate of 90.39 km^2. The NPWS National Fen Survey 2021 to 2023 visited 148 sites where an area of 7230 habitat was mapped and this representative dataset was used to investigate area loss. In the absence of baseline mapping

	with which to compare the current reported extent of the 7230 habitat, remote imagery was used. The earliest available high-resolution colour aerial imagery that could be used to assess loss in 7230 habitat against the NPWS National Fen Survey 2021 to 2023 data was produced in 2000 and 2005, with periodic releases of more up-to-date imagery from 2005 to the present. After comparing the National Fen Survey mapping with the 2000-2005 remote imagery, habitat loss was recorded at 12 of the 148 7230 sites. Five of these losses occurred during the last two reporting periods. At three of the 12 sites the losses were due to conversion into agricultural land, three were due to the construction of built-up areas or a road, two were due to afforestation, the loss at two of the sites was due to scrub encroachment, and at two of the sites the loss was due to inappropriate management such as undergrazing. Across the 148 7230 sites, the total recorded area of 7230 lost due to impacts over the last two reporting periods was 1.42 ha or 0.20% of the total area of 7230 at these 148 sites. Short-term trend in area was deemed to be *decreasing* because the area of 7230 has reduced across five of the surveyed sites during the last two reporting periods due to anthropogenic factors. It should be noted that, based on similar surveys of other Annex I habitats in Ireland, the methodology of estimating area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin *et al*., 2018). The Favourable Reference Area (FRA) was calculated with reference to O'Connell *et al*. (2021) and their analysis of Hammond (1979) and the reported decline in the area of fen habitats over the last 42 years. These data informed a reference-based approach, with information of moderate quality (i.e. good data on current area/distribution and ecological requirements but limited historical area/distribution data) used to inform expert opinion. On a county level, the data presented in O'Connell *et al*. (2021) is highly variable, with some counties showing an increase in fen habitats, probably due to under-recording in some counties by Hammond (1979), while others have a significant decline. Nationally, O'Connell *et al*. (2021) reported a decline of 78.8% in the area of fen habitat (there was an estimated 92,508 ha fen in 1979, with 19,593 ha remaining in 2021). Assuming that the rate of loss of 1,736 ha per annum ((92,508-19,593)/42 years) has been relatively constant (i.e. a linear relationship) over the last 42 years (Ridding *et al*. (2020) reported that fen, marsh and swamp habitats were the only semi-natural habitats in Dorset to decline linearly between 1930 and 2015), this would mean that the area of fen in 1994 (when the EU Habitats Directive came into force in Ireland) was 64,731 ha and 30.3% (19,593 ha) of the fen habitat present in 1994 remained in 2020, as reported by O'Connell *et al*. (2021). This significant decline will have resulted in the loss of fen habitat and the fragmentation of what remains. Assuming that the 7230 habitat has had a similar level of decline as fen habitats in general, the current minimum area of 17.78 km² is estimated to be 69.7% (i.e., between 51% and 100%) smaller than the FRA. It is also assumed that the significantly larger area of 7230 present in 1994 represents an FRA that would allow for the favourable conservation status of the habitat. Based on O'Connell

	et al. (2021) the long-term trend for the 7230 area since 1994 is a loss in area at a rate of -2.7% per annum (-69.7%/26 years).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***9.80 km²***
		Maximum	***49.80 km²***
	b) Area in not-good condition	**Minimum**	***7.98 km²***
		Maximum	***40.59 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing / decreasing /* ***uncertain****/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO*		
6.7 Typical species Method used *Optional*	The methodology has changed as assessment criteria for the 7230 habitat were developed as part of the NPWS Pilot and National Fen Surveys. The number of positive vascular plant indicator species for an assessment stop to pass the Structure and functions assessment is ≥ 2 for small-sedge fens (e.g., IVC community FE1C) and ≥ 3 for *Schoenus* fens (e.g., IVC communities FE1A, FE1B, FE1D, FE2F). The cover of brown mosses and vascular indicator species should be ≥ 20% for the small sedge fens and ≥ 75% for *Schoenus* fens. The list of typical species used for the assessment criteria are: Brown mosses - *Bryum pseudotriquetrum, Campylium stellatum, Campyliadelphus elodes, Ctenidium molluscum, Fissidens adianthoides, Palustriella commutata, Palustriella falcata,*		

	Sarmentypnum sarmentosum, Scorpidium cossonii, Scorpidium revolvens, Scorpidium scorpioides Vascular plants - *Carex demissa, Carex dioica, Carex lasiocarpa, Carex lepidocarpa, Carex panicea, Carex rostrata, Cirsium dissectum, Eleocharis quinqueflora, Juncus bulbosus, Juncus subnodulosus, Lysimachia tenella, Molinia caerulea, Pinguicula vulgaris, Schoenus nigricans, Selaginella selaginoides.* A broader list of typical plant species that are associated with the 7230 habitat was reported in NPWS (2019).
6.8 Additional information *Optional*	The area of 7230 habitat in good condition was calculated for 143 sites surveyed as part of the NPWS National Fen Survey 2021 to 2023 and O'Neill *et al*. (2021). The number of sites where Structure and functions were assessed was less than the 148 sites surveyed because at five sites only small areas of 7230 habitat were recorded. The calculation was based on the percentage of monitoring stops at each site that were assessed to have Favourable Structure and functions. As the sample of 143 sites is considered representative of the national resource, the proportion of areas in good and not-good condition were scaled up to estimate the national area. The percentage of the 7230 habitat in good condition has significantly increased from 25% estimated in the last reporting period (NPWS 2019) to 55.1% in the current reporting period. The short-term trend for the habitat is *uncertain* as the dataset used to report the 25% habitat in good condition in NPWS (2019) was limited.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	High
PA22 Drainage for use as agricultural land	Ongoing and likely to be in the future	Minority <50%	High
PA23 Physical alteration of water bodies (including dams, channels, etc.)	Ongoing and likely to be in the future	Minority <50%	High
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	Medium
PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PB24 Drainage for forestry	Ongoing and likely to be in the future	Minority <50%	Medium

PC06 Dumping/depositing of inert and dredged materials from terrestrial and marine extraction	Ongoing and likely to be in the future	Minority <50%	Medium
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PA17 Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Low
PA20 Live stock farming generating pollution	Ongoing and likely to be in the future	Minority <50%	Low
PB19 Forestry activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Minority <50%	Low
PB26 Other forestry activities, excluding those relating to agro-forestry	Ongoing and likely to be in the future	Minority <50%	Low
PC05 Peat extraction	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PE09 Land, water and air transport activities not referred to above	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	R07248 *Heracleum mantegazzianum* is found adjacent to one *7210 site and is expected to be a pressure in the future.
f) Other invasive alien species *Optional*	*Rhododendron* species*,* *Cotoneaster* species*,* R12332 *Prunus laurocerasus*
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures were recorded during field surveys for the NPWS National Fen Survey 2021 to 2023.
7.4 Additional information *Optional*	The NPWS National Fen Survey 2021 to 2023 visited 148 sites where an area of 7230 habitat was mapped and pressures were recorded. The 20 pressures listed in section 7.2a are all negative pressures that were recorded as impacting the 7230 habitat and considered likely to

	continue to impact the habitat in the future. The timing presented in section 7.1b was decided based on if the pressure was currently impacting the habitat and if, based on expert judgement, it would continue to impact in the future. The scope for each pressure (section 7.1c) was calculated based on the area each pressure impacted nationally as a percentage of the total area of 7230 surveyed. The influence for each pressure was assigned at an individual site level and the data presented in section 7.2d is the influence level that was recorded across the greatest area of 7230 for each pressure. It should be noted that during the National Fen Survey 2021 to 2023, negative pressures were recorded as impacting 90% of the 7230 habitat area. The pressures in the standard list of EU pressures are open to some interpretation; for 16 of the 20 pressures listed in section 7.1a, the description accurately reflects the data recorded, but for four pressures further explanation is needed. PI03 was used by the National Fen Survey to record problematic native species in the form of scrub encroachment. For PA17 the evidence for pollution/nutrient enrichment was often the presence of green slime/algae on plants, substrates or in the water. PE09 'Land, water and air transport activities not referred to above' was used to record off-road vehicle or tractor tracks. PI02 was used to record the impact of invasive non-native species, such as *Rhododendro*n sp., *Prunus laurocerasus*, *Cotoneaster* sp., impacting the 7230 habitat. PB26 was used during the National Fen Survey to record conifer trees self-seeding in the 7230 habitat. PC06 refers to the dumping of spoil (i.e. soil, rock and debris) within the 7230 habitat. PF05 refers to various recreation activities such as disturbance by hikers, fishermen and clay pigeon shooting. PF06 refers to the dumping of garden waster, rubble and household rubbish. *Heracleum mantegazzianum* (R07248) is found adjacent to one *7210 site and is expected to be a pressure in the future.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*

8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA04 Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures MJ02 Reduce impact of multi-purpose hydrological changes MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	During the NPWS National Fen Survey 2021 to 2023, conservation measures were recorded in the general site notes or as positive pressures, such as appropriate grazing with stock (MA03), or removal of encroaching scrub from an area of 7230 to reinstate grazing or mowing (MA04). In addition to site-specific conservation measures, common high influence negative pressures on the 7230 habitat, such as PA07 'Intensive grazing/overgrazing by livestock' or PA22 'Drainage for use as agricultural land', are sometimes addressed on a broader scale by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g., Carra LIFE), the Department of Agriculture's ACRES agri-environment scheme, or national initiatives such as the Environmental Protection Agency enforcing water quality standards. With 44.9% of the 7230 area surveyed during the current reporting period in 'not-good' condition, there is a need for conservation

	measures, such as drain blocking, to be applied across a significant area of the habitat. However, based on the data collected during the NPWS National Fen Survey, there is little evidence to suggest that conservation measures are being implemented on an appropriate scale to maintain the current area, or structure and functions of the 7230 habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The future trend for the Range parameter is assessed as *stable*, with the negative influence of the reported threats balanced against conservation measures judged to have no significant impact on the overall range of the 7230 habitat over the next 12 years. As the current status of the parameter is *Favourable* and the future trend is assessed as *stable*, the Future prospects for Range are *Good*. The future trend of Area is assessed as *negative* based on the negative influence of the reported threats balanced against conservation measures. Only a small loss of area (1.42 ha or 0.20% of the total area surveyed 2021-2023) was recorded during the NPWS National Fen Survey, but based on similar surveys of other Annex I habitats in Ireland, the methodology of recording area loss based on remote imagery significantly underestimates area loss compared to using field data collected over multiple monitoring periods (Martin *et al*., 2018). Therefore, based on expert judgement, the current status of the Area parameter is assessed as *Unfavourable-Bad* and together with a *negative* trend this results in *Bad* Future prospects. The current status of the Structure and functions parameter is assessed as *Unfavourable-Bad*, because <75% of the 7230 area assessed during the current reporting period is in good condition. Based on an assessment of the negative influence of the reported threats balanced against conservation measures, the future trend is assessed as *negative* and the Future prospects of Structure and functions are *Bad*.	

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable*** *(FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad*** *(U2) / Unknown (XX)*

<table>
<tr><td>10.5 Overall assessment of Conservation Status</td><td colspan="2">Favourable (FV) / Inadequate (U1) / <u>Bad</u> (U2) / Unknown (XX)</td></tr>
<tr><td>10.6 Overall trend in Conservation Status</td><td colspan="2">Indicate the trend (qualifier) for FV, U1 and U2:

improving / <u>deteriorating</u> / stable / unknown</td></tr>
<tr><td rowspan="8">10.7 Change and reasons for change in conservation status and conservation status trend</td><td colspan="2">Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.</td></tr>
<tr><td>Overall assessment of conservation status (10.5)</td><td>Overall trend in conservation status (10.6)</td></tr>
<tr><td><u>a) No, there is no difference</u></td><td><u>a) No, there is no difference</u></td></tr>
<tr><td>b) yes, due to genuine change</td><td>b) yes, due to genuine change</td></tr>
<tr><td>c) yes, due to improved knowledge/more accurate data</td><td>c) yes, due to improved knowledge/more accurate data</td></tr>
<tr><td>d) yes, due to the use of different method</td><td>d) yes, due to the use of different method</td></tr>
<tr><td>e) yes, but nature of change is unknown</td><td>e) yes, but nature of change is unknown</td></tr>
<tr><td>f) yes, due to other reasons</td><td>f) yes, due to other reasons</td></tr>
<tr><td>10.8 Additional information

Optional</td><td colspan="2">For the parameter of Range, the status is assessed as Favourable as the surface area of the range is not smaller than the Favourable Reference Range and the short-term trend is stable.

For the parameter of Area, the status is assessed as Unfavourable-Bad as the current area is more than 10% below the Favourable Reference Area.

The status of the Structure and functions is Unfavourable-Bad because “more than 25% of the area is unfavourable as regards its specific structure and functions” (Anon., 2022).

The status of Future prospects is also Unfavourable-Bad due to the fact that Area and Structure and functions have Bad Future prospects. As three of the parameters have a status of Unfavourable-Bad, the Overall Conservation Status assessment is therefore Unfavourable-Bad.

For the parameters Area and Structure and functions, the future trend is assessed as negative based on the negative influence of the reported threats balanced against conservation measures. Therefore, the overall trend in Conservation Status is deteriorating as only the parameter of Range is judged to be stable.</td></tr>
</table>

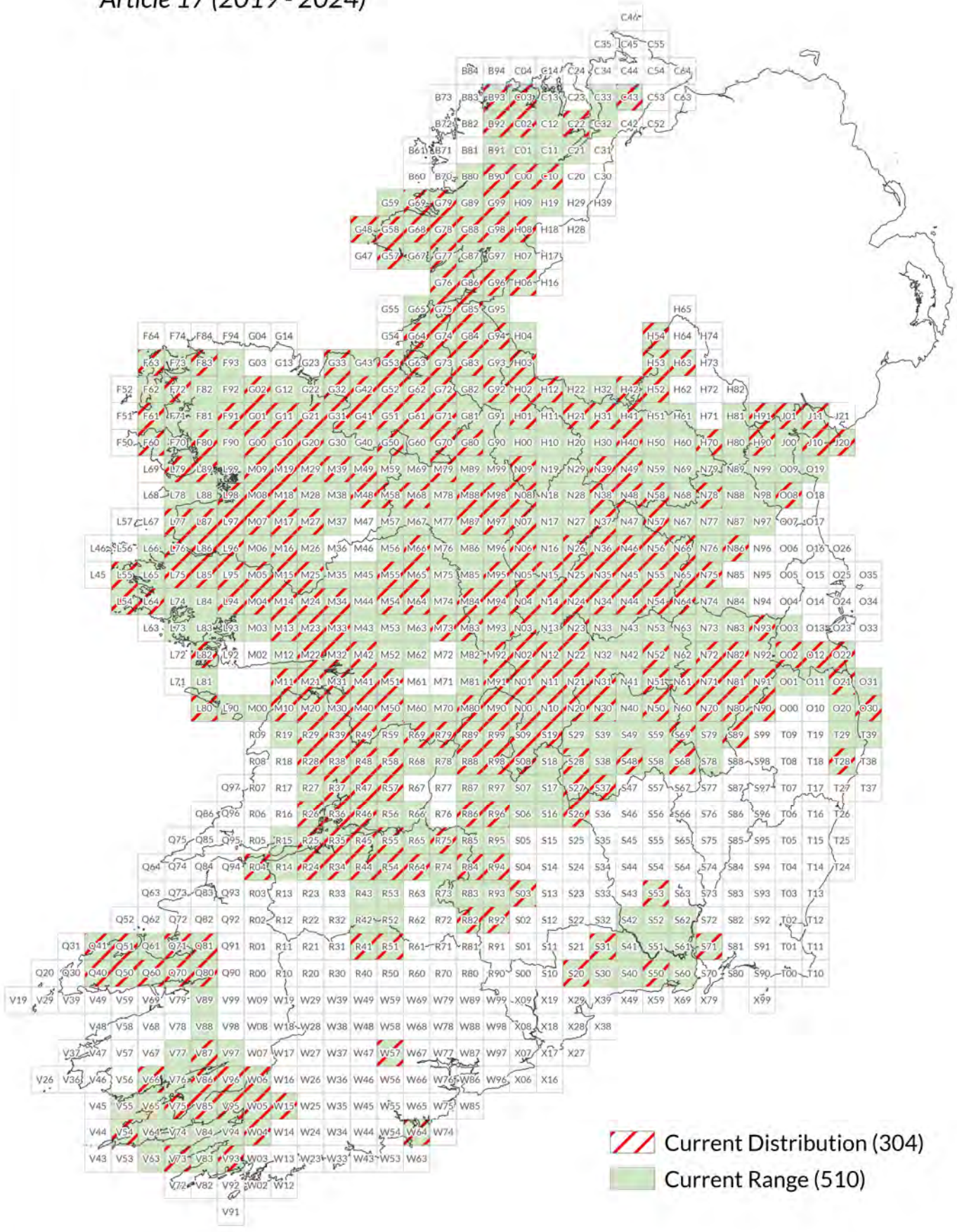
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***8.66 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* *c) decreasing* ***d) uncertain*** *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the Natura 2000 network and associated trends were estimated by performing a union between the 7230 polygon shapefile and the SAC shapefile and an intersect between the 7230 point shapefile and the SAC shapefile. The area given in 11.1 (c) is the best estimate of the total area of the 7230 habitat in SACs in the country, including some SACs where the habitat is not listed as a qualifying interest (QI). The range from minimum to maximum is 8.52-48.18 km². The area of 7230 within the SAC network where it is listed as a QI ranges from 7.16 km² to 28.39 km². The accuracy of these area values	

	will be affected by the point shapefile. This is due to the fact that a point may fall within an SAC, but relate to an area partly or entirely outside the SAC network, and vice versa. The significant difference between the habitat extent recorded within SACs during the current reporting period and the last (NPWS, 2019) is primarily due to more accurate data, with the first national survey for the 7230 habitat undertaken as part of the NPWS National Fen Survey during the current reporting period. The current best estimate of 8.66 km^2 reported in section 11.1 is smaller than the best estimate of 64.83 km^2, reported in NPWS (2019). This is due to a number of factors, including a differing methodology, as the previous rounds of monitoring presented extensive data from desk studies, which resulted in a less accurate dataset than one based on ground-truthed dedicated surveys. For example, the inclusion of almost all of the area of large bog SACs within the total 7230 area in the NPWS (2019) area calculation, such as the 3.5 km^2 Garriskil Bog SAC (000679) and 4.7 km^2 Mount Hevey Bog (002342) and 2 km^2 Crosswood Bog SAC (002337), explains some of the differences in area between reporting periods. An analysis of the habitat polygon shapefiles that supported the NPWS (2019) figures found that there was extensive and often complete overlap of areas for the three habitats 7140, 7210 and 7230. The habitat polygons 7140 and 7230 overlapped by 32.28 km^2 and the habitat polygons of 7230 and 7210 overlapped by 36.29 km^2. Reviewing these polygons and applying more appropriate estimates for the 7230 habitat is a significant cause of the drop in 7230 area found within SACs. There was a recorded nett loss of 0.13 ha of 7230 habitat from SACs over the last two reporting periods, with the remaining 1.29 ha lost from outside SACs. Of the SACs where 7230 habitat is listed as a QI, there was also a net loss of 0.13 ha, as the 7230 habitat is a QI within the two SACs where an area was lost. The short-term trend of the habitat area within the SAC network is taken to be *decreasing*, the same trend as the habitat nationally. There were small recorded area losses over the last 12 years which are considered to be an underestimate of overall losses over the period. The current reporting period is the first time that accurate data have been recorded for this Annex I habitat on a national scale. The short-term trend for the Structure and functions for the habitat within the SAC network is *uncertain*, the same trend as the habitat nationally, as the dataset used to report the percentage of habitat in good condition in NPWS (2019) was limited. The accuracy of the estimate of the surface area value inside SACs will be affected by the point shapefile used to determine it. This is due to the fact that a point may fall within an SAC but relate to an area partly or entirely outside the SAC network, and vice versa.

12 Complementary information *N/A*

Alkaline fens (7230)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)**
1.2i Habitat short name	**Siliceous scree**
1.3i Habitat description	Guidance on interpretation of habitat 8110 Siliceous scree in an Irish upland context is provided by Perrin *et al.* (2014c). It consists of accumulations of siliceous rock fragments on slopes below upland cliffs or on exposed/frost-shattered mountain summits or ridges. While there is no strict lower altitudinal threshold, this habitat is interpreted as referring to examples of scree occurring in a broadly upland landscape context. Rock sizes may vary from large blocks (also known as talus) that can be very stable, to smaller fragments that may be highly mobile. Areas of loose rock on summits or plateaux exposed by erosion of peat and areas akin to fell-field are not included in 8110 habitat, nor are screes beneath a vegetation cover that indicates other habitats (e.g. dry heath or scrub). Siliceous scree vegetation can be very sparse and consist chiefly of bryophyte and lichen assemblages, though calcifuge ferns (e.g. *Dryopteris dilatata* and *Hymenophyllum wilsonii*) and, in western areas, the saxifrage species *Saxifraga spathularis* are typically present. The habitat may support species belonging to the *Androsacion alpinae* association and the scree communities *Racomitrium fasciculare – Festuca vivipara* (RH2B) and *Racomitrium lanuginosum – Hypnum jutlandicum* (RH2C) of Perrin (2024). Siliceous scree supports several species of high conservation value including legally protected Flora (Protection) Order 2022 (S.I. 235/2022) and Red-listed bryophytes (Lockhart *et al.,* 2012), particularly species of the 'mixed northern hepatic mat' community including *Adelanthus lindenbergianus*, which are also considered rare or threatened on a European scale (Hodd & Sheehy Skeffington, 2011).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1975-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*

2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was generated using a polygon shapefile and a point shapefile. These shapefiles are a compilation of relevant data referring to habitat 8110 or Fossitt code ER3 (Fossitt, 2000), or a relevant NPWS or Irish Vegetation Classification (IVC) habitat code. Sources that added data to the distribution map this reporting period are: three National Survey of Upland Habitats (NSUH) sites (Barron *et al.* 2022a,b; Hodd *et al.* 2022), Hodd (2023), Hodd *et al.* (in prep.), Scott Cawley (2021) and R.L. Hodd (personal records). In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: 15 sites surveyed by the National Survey of Upland Habitats (NSUH) (Perrin *et al.* 2011, 2012, 2013a-e, 2014a-b; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012), Coillte Biodiversity Dataset (various dates), Foss *et al.* (2014, 2015), Hodd (2007, 2015a-b), O'Neill *et al.* (2020), Perrin (2024), Tubridy *et al.* (2015), Barron & Perrin (2010, 2011), Connemara and Glenveagh National Park Habitat Maps, NPWS (2013a), DTM data analysis (NPWS, 2007), NPWS Habitat Assignment Project (original survey work for the Habitat Assignment Project commenced in 1975) and aerial imagery interpretation in consultation with NPWS. All references are detailed below in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. For this round of reporting, all new sources added were assigned a certainty rating of 3, as they were either collected during targeted surveys of upland habitats or are based on observations by an expert recorder who is highly familiar with the habitat. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura

	Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. Hodd, R. (2023) Habitat and botanical survey of the wild atlantic rainforest Knockaunbaun site, Maamturks, Co. Galway. Report for Hometree, Ennistymon, Co. Clare. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) The status of four uncommon grassland types in Ireland. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Hodd, R.L. Personal records used to populate the 8110 habitat point distribution shapefile. Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG. **Datasets included in NPWS (2019) and retained for the distribution maps this reporting period:** Aerial photograph interpretation. For the previous reporting period (NPWS 2013b) a number of points were added for the Inishowen and Fanad peninsulas in Donegal and Mount Leinster. These points were carried through for this reporting period. Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Barron, S. & Perrin, P. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Coillte Biodiversity Dataset. GIS files and individual site management plans were made available by Coillte. Datasets used were from 2002 to 2004. Connemara National Park Habitat Map is an NPWS map based on aerial photographic interpretation and field visits conducted by G. Kaule from the University of Stuttgart in 2008. Foss, P.J., Crushell, P., Kirwan, B., O'Loughlin, B. & Wilson, F. (2014) Louth Wetland Survey III. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council.

	Foss, P.J., Crushell, P. & Kirwan, B. (2015) County Waterford Wetland Survey. Part 1: Main Report. Report prepared for Waterford City & County Council. Glenveagh National Park Habitat Map is an NPWS map produced in 2010 based on the NHA survey data collected between 1991 and 1994. The map is derived from the best information available at the time, site visits and aerial photograph interpretation. Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and pNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Hodd, R.L. (2007) The Vegetation and Ecology of the Scree Slopes of the Macgillycuddy's Reeks, Co. Kerry. BSc. Thesis, Department of Botany, NUI Galway. Hodd, R.L. (2015a) Survey of Flora Protection Order Bryophytes 2015. Unpublished report to National Parks and Wildlife Service, Dublin, Ireland. Hodd, R.L. (2015b) Survey of Flora Protection Order Bryophytes in Cork and Kerry (H1-H5). Unpublished report to National Parks and Wildlife Service, Dublin, Ireland. NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. DTM data. For the 2001-2006 reporting period (NPWS, 2007), analysis of a DTM was used to produce a polygon shapefile identifying areas above 350 m in altitude with a north or northeast aspect and over 40° in slope. These polygons identify areas of 8220 Siliceous rocky slopes rather than 8110 habitat, but it is logical to assume that there is a good chance of scree occurring in association with these areas. Points representing the centroids of these polygons were therefore added to the 8110 habitat point shapefile in 2012 (NPWS, 2013b) and were carried through for this reporting period. NPWS (2013a) Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp) O'Neill, F.H., Long, M.P. & Hodd, R.L. (2020) Monitoring of the Annex V Clubmoss group (Lycopodium spp.) in Ireland 2015-2018. *Irish Wildlife Manuals*, No. 117. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland. Perrin, P. M. (2024) *Handbook for the Irish Vegetation Classification*. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024. Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010-2012) Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932), Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***16,500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	

	d) Unknown	
4.6 Short-term trend **Magnitude** **Type of estimate** *Optional*		
4.7 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend **Period** *Optional*	***2000-2024***	
4.9 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 16,500 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	

4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.
4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 8110 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The reported range of 165 occupied 10x10 km grid cells is nine cells higher than that reported in NPWS (2019). This does not represent a genuine increase in the range of the habitat but is a result of improved knowledge of the distribution of the habitat. Additional grid cells have been added to the range in the vicinity of the Slieve Aughty Mountains in East Clare and Southeast Galway, the Ballyhoura Mountains in Limerick and Cork, Tully Mountain in West Galway, Glenlough in Southwest Donegal, the Blue Stack Mountains in South Donegal and Carrickgollogan Hill in South Dublin. The additions to the distribution in the Slieve Aughty Mountains and Ballyhoura Mountains results from NSUH surveys (Barron et al., 2022a, b; Hodd et al., 2022), while the other additions result from observations by reliable, expert recorders. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Although there are limited data on this habitat for the current reporting period, with only three NSUH sites containing the habitat surveyed, there is no evidence of loss of habitat. Therefore, the short-term trend is assessed as *stable*. Similarly, the long-term trend is assessed as *stable*, as there is no evidence of loss, albeit based on limited data. Favourable Reference Range is equal to the current range. This is higher than that reported in the previous period, reflecting the increased knowledge of the range and distribution of 8110 in Ireland, rather than a genuine change. No loss of range has occurred since the Directive came into force and it is considered that the range when the Directive came into force is sufficient to include the full range of ecological variation of the habitat. The range is also regarded as large enough to ensure that the habitat survives in the long term.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1975-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***16.70 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	

5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	

5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km²*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*	There is no evidence of loss of area since the Directive came into force.	
5.17 Additional information *Optional*	The surface area of the habitat was determined over a period beginning in 1975, when original survey work for the Habitat Assignment Project commenced, and incorporates updates made by surveys up until 2023. A full list of these resources is presented in section 3.4. Area was calculated from the polygon shapefile and point shapefile used for distribution. All 8110 points located more than 20 m from 8110 polygons had an area of 400 m² applied. This point area (m²) was used	

	during previous reporting periods and carried over to the current reporting period to maintain consistency. Surface area of the 8110 habitat has increased from 15.50 km² in NPWS (2019) to 16.70 km² this reporting period. Sources attributed to this increase comprise: NSUH surveys (Barron *et al*., 2022a,b; Hodd *et al*., 2022), Hodd (2023), Hodd *et al*. (in prep.), Scott Cawley (2021) and R.L. Hodd (personal records). These additions represent previously unmapped 8110 habitat rather than genuine increases in 8110 surface area. More detailed survey work of the 8110 habitat is needed, and it is expected that the area listed in section 5.2 will be refined as more in-depth mapping of the 8110 habitat is completed. In particular, any area represented within the dataset by only a point needs to be surveyed in more detail. In addition to refining the areas of 8110 habitat currently known, there are probably still areas of unmapped 8110 habitat within the country. The area value entered is therefore a minimum. Of the datasets used to map the 8110 distributions, loss of area was only fully assessed during National Survey of Upland Habitats (NSUH) surveys. Any conclusions regarding area loss are tentative and at a low level of confidence. Eighteen NSUH datasets were used in the Area assessment (Barron et al. 2022a,b; Hodd *et al*. 2022; Perrin *et al*. 2011, 2012, 2013a-e, 2014b-c; Roche *et al*. 2009, 2010a, 2010b, 2011a, 2011b, 2012). Seventeen of these NSUH sites are within SACs, therefore, losses within these sites are not fully representative of the losses occurring outside the SAC network where losses would be expected to be larger. These eighteen datasets represent 62.7% of the total area of the mapped 8110 habitat. The default trend periods are presented above and are used to calculate the magnitude of annual loss. Short-term trend direction for Area was determined to be *stable*. At the sample of sites covered by the NSUH there were no recorded losses of 8110 habitat since 2013. Similarly, no gains in habitat were noted within this time period. Long-term trend direction for Area was determined to be *stable* overall. Since 2000, there was no recorded losses in 8110 habitat from NSUH sites. One minor gain (<0.01ha) occurred at Ox Mountains Bogs SAC (002006) as a result of a landslide (Perrin *et al*., 2013a). Favourable Reference Area (FRA) is deemed to be approximately equal to the current area. There is no information showing that an enlarged area is necessary for either typical species to reach favourable conservation status or for the necessary structures and functions to exist, therefore the surface area of the habitat when the Directive came into force in 1994 is taken to be the FRA. While this figure is unknown, it is deemed to be approximately equal to the current area as there is no evidence of significant declines since this time.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***12.19 km²***
		Maximum	***16.70 km²***
	b) Area in not-good condition	**Minimum**	***0 km²***
		Maximum	***4.51 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		
6.7 Typical species Method used *Optional*	Typical indicator species for the 8110 habitat are: *Asplenium adiantum-nigrum*, *Athyrium filix-femina, Blechnum spicant*, *Dryopteris* spp. (count separately), *Hymenophyllum tunbrigense, Hymenophyllum wilsonii, Saxifraga spathularis* and *Rhodiola rosea.*		
6.8 Additional information *Optional*	Perrin *et al.* (2014c) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. Monitoring stop data for the current reporting period were available from one NSUH site (an SAC). This stop passed the assessment on all criteria (Hodd *et al.*, 2022) and Structure and functions of the habitat were assessed as *Favourable* at the site. As this assessment covers only 0.06 ha of 8110 habitat, this assessment cannot be taken to be indicative of the overall Structure		

	and functions of 8110 nationally. Therefore, it is necessary to include assessments from the previous two reporting periods to give a more accurate overview of the national Structure and functions. There is no evidence that the condition of 8110 habitat has significantly improved or declined, so the assessment results from NPWS (2019) and NPWS (2013b) should still be representative. If assessments from the current and previous reporting period, since 2013, are taken into account, there are a total of 12 assessments to consider. All 12 (100%) stops were assessed as *Favourable*. Scaled up to the national area of habitat, this equates to 16.70 km² of 8110 habitat in good condition and 0.00 km² in not-good condition. These figures were taken as the maximum area in good condition and minimum area in not-good condition, respectively. Following analysis of 48 8110 monitoring stops from 14 NSUH sites surveyed between 2009-2011, NPWS (2013b) assessed 73% of stops as in good condition and 27% as in not-good condition. Scaled up to the national area of habitat, this equates to 12.19 km² of 8110 habitat in good condition and 4.51 km² in not-good condition. These figures were taken as minimum area in good condition and maximum area in not-good condition, respectively. The most frequent criteria to fail the Structure and functions assessment were 'cover of bryophyte species and non-crustose lichens', 'number of positive indicator species', 'cover of grass species and dwarf shrubs' and 'proportion of vegetation composed of non-native species' (NPWS, 2013b). Similar to the NPWS (2019), the short-term trend of habitat area in good condition is assessed as *stable* based on expert opinion.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R05653 *Epilobium brunnescens* R02685 *Campylopus introflexus* R02717 *Capra hircus* R03227 *Cervus nippon*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	As there is no information on threats to 8110 habitat originating from the current reporting period, information on threats was sourced from the assessments completed in previous reporting periods and the references contained therein: NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union, 1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services
7.4 Additional information *Optional*	No pressures or threats were recorded in the three sites containing 8110 habitat that were surveyed by the NSUH during the current reporting period (Barron *et al.* 2022a,b; Hodd *et al.* 2022) and no other information on 8110 pressures and threats for the current reporting period were located in other sources. In light of the lack of available data for the current reporting period, the pressures and threats reported for the current reporting are based mainly upon the pressures and threats reported in the previous two reporting periods (NPWS, 2019; NPWS 2013b). PA07 'Intensive grazing or overgrazing by livestock' was identified as a medium-importance pressure in NPWS (2019) and retained as a medium-influence pressure this reporting period. Overgrazing by

	sheep can damage 8110 vegetation, cause erosion and lead to nitrogen enrichment. Nitrogen is highly toxic to many bryophyte species and scree habitats support important bryophyte communities (e.g. leafy liverwort communities of the so-called northern hepatic mat vegetation) (Long, 2010; Hodd & Sheehy Skeffington, 2011). PA08 'Extensive grazing or undergrazing by livestock' (i.e. undergrazing) and PM07 'Natural processes without direct or indirect influence from human activities or climate change' (i.e. natural succession) were recorded as medium-importance pressures for the 8110 habitat in NPWS (2019) based on evidence from NPWS (2013b). Areas of stable block scree, which are often inaccessible to grazers, are prone to colonisation by species atypical of scree (e.g. Bracken, heath, scrub). Scree is a dynamic habitat, however, and any losses from the above activities are likely balanced through the creation of new habitat by erosion (although not necessarily at the site scale). Based on expert opinion, PA08 and PM07 were reassessed as low-influence pressures for this reporting period. Low-importance pressures based on evidence from the previous reporting periods and retained as low-influence this reporting period comprise: PF05 'Sports, tourism and leisure activities' (e.g. walking and bouldering), PI03 'Problematic native species' (e.g. Bracken encroachment on stable block scree), PI02 'Other invasive alien species (other than species of Union concern)' (e.g. *Epilobium brunnescens*, *Campylopus introflexus*; feral goat and non-native deer are also likely having negative impacts on 8110 habitat, especially in population hot-spots), PK03 'Mixed source air pollution, air-borne pollutants' and PA09 'Burning for agriculture'. The code PH04 'Vandalism or arson (incl. human-introduced wildfire)' was also added as a low-influence pressure during the current reporting period. To further investigate the impact of burning during the current reporting period, an EFFIS burnt area shapefile for the Republic of Ireland based on MODIS imagery was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped 308 large fire events in the Republic of Ireland covering 18,590 ha. The 8110 polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. Analysis indicates that approximately 38.29 ha of 8110 habitat were subject to (or located within the vicinity of) a large burn event this reporting period. Climate change (PJ) was ranked as a low importance threat in NPWS (2019). It is predicted to impact on the occurrence of arctic-alpine plants in Ireland (EPA, 2017; Wyse Jackson, 2007). Some of these arctic-alpine plants are found in high-quality examples of this habitat. A predictive modelling study by Hodd *et al.* (2014) reports that oceanic bryophytes of hepatic mat and oceanic montane species groups, such as *Anastrepta orcadensis* and *Scapania ornithopodioides*, many of which occur in scree habitat, may lose climate space to the south and gain space in northerly areas of Ireland, suggesting a northward shift in their distribution (this scenario assumes unlimited dispersal potential) (PJ01). However, topography as well as climate

	plays a key role in the distribution of these species. Hodd *et al.* (2014) admit that it is possible that by modelling at the 10 km x 10 km resolution they are losing potential to identify local climate refugia for species persistence and rapid migration, particularly in areas such as the west coast of Ireland where there are large, local-scale variations both in elevation and climate. Habitats that are degraded from inappropriate land uses, and currently in unfavourable condition, will have the least resilience. Increased rainfall events from climate change (PJ03) could potentially lead to greater scree instability and more erosion, which may impact the vegetation growing on the scree slopes. Without more habitat-specific quantitative research, it is very difficult to predict the timeframe for significant effects of climate change to manifest, and small but incremental changes are likely already occurring. Until further information is available, climate change is thus retained as a low-influence pressure for this reporting period, although in the longer term it is likely to be a more significant pressure.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MI03 Management, control or eradication of other invasive alien species ME01 Reduce impact of transport operation and infrastructure MF03 Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)
8.7 Additional information *Optional*	Conservation measures are selected based on NPWS (2019), the NPWS Conservation Measures Unit (CMP, 2025), Department of Agriculture, Food and the Marine (DAFM) and expert opinion. The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Microsoft Excel spreadsheet was reviewed for measures associated with the 8110 habitat. One measure is listed: MA06, in the form of replacement of fencing to prevent sheep from trespassing in part of The Twelve Bens/Garraun Complex SAC (002031). The extent of 8110 habitat impacted by this measure was not provided. Two notable mountain path restoration projects were active within the current reporting period. These comprise: the 'ASCENT' initiative on Errigal Mountain in Donegal (www.ascent-project.eu/errigal-mountain) and the Croagh Patrick 'Sustainable Access and Habitat Restoration Project' (www.croaghpatrick.net). The 8110 habitat forms a significant component on both these sites. The restored paths address erosion issues, prevent future trail creep, and promote natural recovery and revegetation of adjacent impacted habitats (MF03).

	Apart from the above measures (MA06, MF03), no other targeted conservation measures are currently in place specifically for 8110 habitat and any effects of measures on this habitat are incidental. Agricultural measures likely having a positive effect on this habitat are MA03 'Maintain existing extensive agricultural practices and agricultural landscape features' and MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', with the extent of the impact of these measures on 8110 habitat unknown. A range of agri-environmental schemes were in operation in the Irish uplands during the current reporting period; the majority of these schemes targeted peatlands habitats (e.g. LIFE IP Wild Atlantic Nature, EIPs such as the Blackstairs Farming Futures (2018-2023) and Sustainable Uplands Agri-environment Scheme (2018-2022)). The primary scheme which may have some positive impacts is the Agri-Climate Rural Environment Scheme (ACRES), which is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high-priority geographical areas are included under ACRES Co-operation Project (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. Given the wide scope and geographical spread of ACRES, it is likely that there are some positive benefits for 8110 habitat through regulation and the promotion of sustainable grazing practices. It will likely be several years before the benefits of these measures become evident. Staff in the National Parks are typically involved in maintenance of tracks and trails to prevent damage to sensitive habitats (ME01), control of invasive species such as Sika Deer (MI03), work to reduce illegal fire activity (MA05, MA06) and enforcement of the Ministerial Direction 2010 on the use of All Terrain and Off-Road Vehicles (MF03). Wider implementation of some of the measures mentioned above (MA05, MA06, MF03, ME01), as well as implementation of MI03 to target invasive plants within the 8110 habitat such as *Epilobium brunnescens* and *Campylopus introflexus* (if control of these species is viable) and/or wider management of non-native grazers (as required) would benefit the 8110 habitat. Additional research on this habitat, along with enhanced monitoring (e.g. nitrogen deposition, climate and grazing impacts), is necessary to ensure effective conservation into the future.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information	Short-term trend direction of Range is assessed as *stable.* Current range is equal to Favourable Reference Range. Conservation status of	

Optional	Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in Range is expected. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is approximately equal to the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in Area is expected. Future prospects of Area are therefore *Good*. Short-term trend direction is *stable* for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A maximum estimate of 27% of 8110 habitat is in poor condition, which equates to *Unfavourable-Bad* Structure and functions. However, due to insufficient data this 27% was carried over from NPWS (2013b). Of the 12 monitoring stops conducted since 2013 (i.e. data from NPWS (2019) and the current reporting period combined), 100% of these were assessed as *Favourable*. On this basis, an *Unfavourable-Inadequate* assessment was deemed more appropriate. Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *stable*, as although the threat of overgrazing is expected to have a negative influence on Structure and functions, this threat is not expected to change the overall status of Structure and functions within the next 12 years. Where the conservation measures MA03, MA05 (targeting domestic grazers) and MI03 (targeting non-native grazers) are implemented, these would be expected to result in a reduction of the impacts of overgrazing; however, it should be noted that these are not targeted measures for the 8110 habitat, nor will they be implemented across the national distribution of the habitat. Currently there is no plan to tackle invasive non-native plants (MI03) within this habitat. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*

10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Structure and functions and Future prospects are *Unfavourable-Inadequate* in this reporting period, as they were in the previous reporting period. The Overall assessment of Conservation Status was assessed as *Unfavourable-Inadequate*, as it was during the last reporting period. The status of *Unfavourable-Inadequate* during the current reporting period was due to <90% of the area of 8110 habitat being assessed as having good (*Favourable*) Structure and functions. Trend in Overall assessment of Conservation Status was assessed as *stable* in this reporting period, as it was during the last reporting period.	

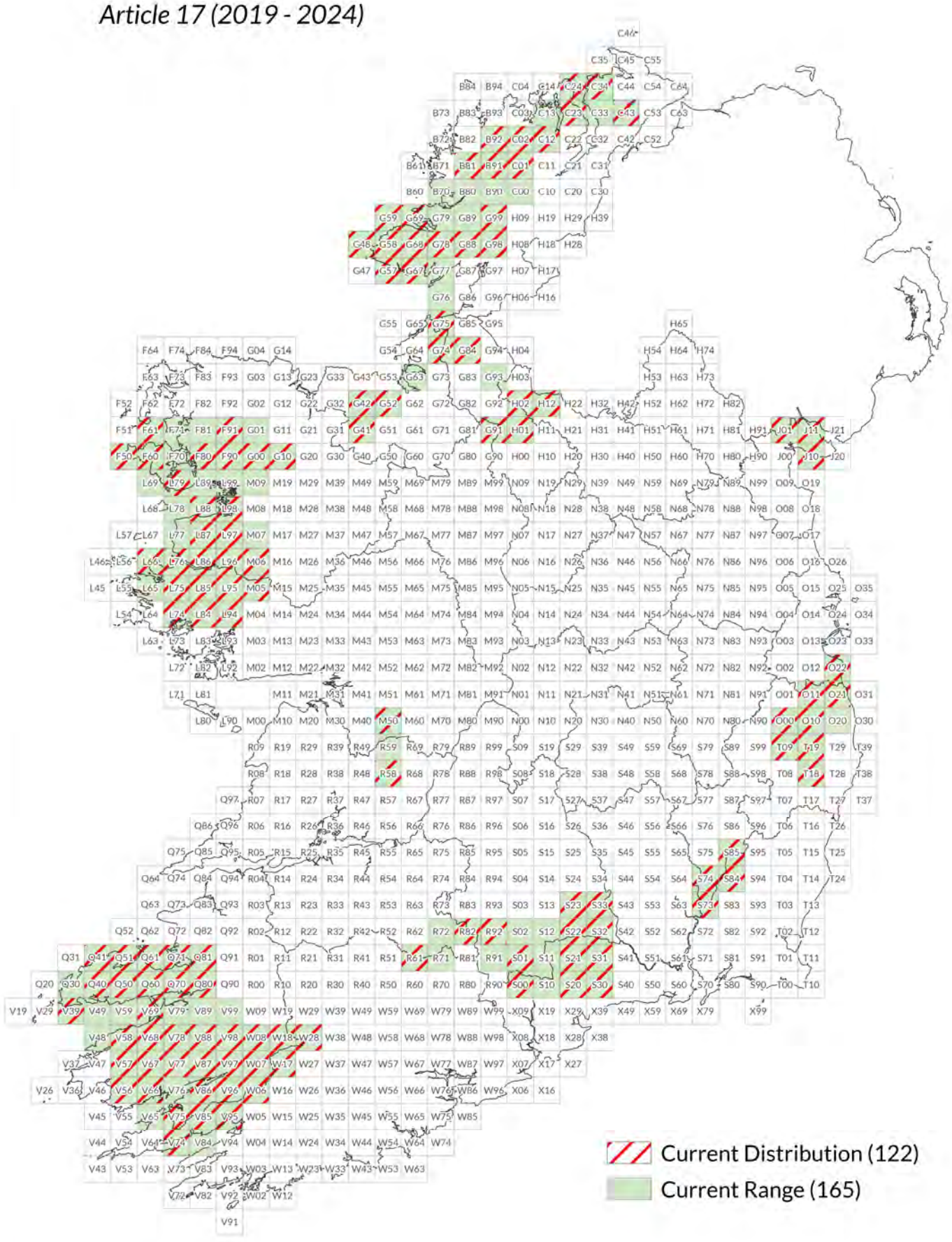
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***14.86 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable** / increasing / decreasing / uncertain/ unknown*
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 8110 habitat in SACs in the country, including some SACs where 8110 is not listed as a qualifying interest (QI). The area of 8110 within the SAC network where it is listed as a QI is 11.24 km^2. No anthropogenic loss of 8110 habitat was reported in the current reporting period. The surface area of 8110 habitat within the SAC network has increased by 1.2 km^2 since the last reporting period, however this is solely due to improved knowledge lending itself to a refinement of area totals (see section 5.17 for details). The short-term trend of area within the SAC network is taken to be *stable*, the same trend as the 8110 habitat nationally. The short-term trend of the 8110 habitat in good condition within the SAC network is taken to be *stable*, the same trend as the 8110 habitat nationally (section 6.4).

12 Complementary information *N/A*

Siliceous scree (8110)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)**
1.2i Habitat short name	**Calcareous scree**
1.3i Habitat description	Guidance on interpretation of 8120 Calcareous scree habitat in an Irish upland context has been provided by Perrin *et al.* (2014b). It consists of accumulations of calcareous rock fragments on slopes below upland cliffs and on rocky slopes. Rocks may vary in size from large blocks (also known as talus) that can be very stable, to smaller fragments that can be highly mobile. Most areas of calcareous scree in Ireland are derived from a limestone bedrock, but in some instances are derived from other sedimentary rocks, as well as metamorphic rocks, such as Connemara marble. Areas of scree beneath woodland, scrub or other habitats are not included within this habitat (and should be assigned to the covering habitat). While there is no strict altitudinal threshold, 8120 habitat is limited to examples of scree occurring in a broadly upland landscape context. The vegetation may be very sparse and can chiefly comprise bryophyte and lichen assemblages, although calcicole ferns, including *Asplenium trichomanes* and *A. adiantum-nigrum*, are typically present, alongside a suite of other characteristic vascular plants of calcareous habitats. Relevant IVC communities (Perrin, 2024) are the RH1A *Asplenium trichomanes – Ctenidium molluscum* crevice community, and very rarely the RH2D *Angelica sylvestris – Breutelia chrysocoma* ledge community. There are no rare bryophytes specifically associated with calcareous scree, although a range of rare bryophytes, such as *Didymodon maximus*, which is listed on the Flora (Protection) Order (2022), may occur in this habitat. While the presence of arctic-alpine species, such as *Arabidopsis petraea, Saxifraga oppositifolia, Polystichum lonchitis* and *Asplenium viride*, indicates high-quality examples of the habitat, their presence is not deemed a requisite.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1975-2022***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*

2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was generated using a polygon shapefile and a point shapefile. These shapefiles are a compilation of relevant data referring to habitat 8120 or Fossitt code ER4 (Fossitt, 2000), or a relevant NPWS or Irish Vegetation Classification (IVC) habitat code. The 8120 habitat was not recorded from the National Survey of Upland Habitats (NSUH) sites surveyed this reporting period. The only sources adding data to the distribution map this reporting period are: Hodd *et al.* (in prep.) and R.L. Hodd (personal records). In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: six NSUH sites (Perrin *et al*. 2011, 2012, 2013a-c, 2014a), the Coillte Biodiversity Dataset (various dates), Perrin (2024), Martin *et al.* (2018), Barron & Perrin (2010), NPWS (2013a), the NPWS Habitat Assignment Project (original survey work for the Habitat Assignment Project commenced in 1975), Webb & Scannell (1983), and NPWS Ranger data. All references are detailed in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. For this round of reporting, all new sources added were assigned a certainty rating of 3, as they were either collected during targeted surveys of upland habitats or are based on observations by an expert recorder who is highly familiar with the habitat. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Hodd, R.L., Perrin, P.M. & Daly, O.H. (in prep.) The status of four uncommon grassland types in Ireland. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

	Hodd, R.L. Personal records used to populate the 8120 habitat point distribution shapefile. **Datasets included in NPWS (2019) and retained for the distribution maps this reporting period:** Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Coillte Biodiversity Dataset. GIS files and individual site management plans were made available by Coillte. Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and pNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. *Irish Wildlife Manuals*, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. NPWS (2013a) Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp). NPWS Ranger data. A number of point records of scree in the Burren were provided by a local NPWS ranger. These points were carried through for this reporting period. Perrin, P. M. (2024) *Handbook for the Irish Vegetation Classification*. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024. Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010 - 2012) Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932), Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. Perrin, P.M., Roche, J.R., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 7: Mount Brandon cSAC (000375), Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013a) National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 11: Ben Bulben, Gleniff and Glenade Complex cSAC (000623), Co. Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013b) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 12: Arroo Mountain cSAC (001403), Co. Leitrim. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013c) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 14: Slieve League cSAC (000189), Co. Donegal. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L. & Devaney, F.M. (2014a) National Survey of Upland Habitats (Phase 4, 2013-2014), Site Report No. 16: Caha Mountains cSAC (000093), Cos. Cork and Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Webb, D.A. & Scannell, M.J.P. (1983) Flora of Connemara and the Burren, Royal Dublin Society and Cambridge University Press, Cambridge.

Other publications consulted:

CMP (2025) NPWS Conservation Measures Programme 2022-2024. Unpublished data, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin.

EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford.

Flora (Protection) Order (2022) Statutory Instrument No. 235 of 2015. Dublin: Stationery Office.

Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Hodd, R.L., Bourke, D. & Sheehy Skeffington, M. (2014) Projected Range Contractions of European Protected Oceanic Montane Plant Communities: Focus on Climate Change Impacts Is Essential for Their Future Conservation. *PLoS ONE* 9(4), e95147.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.

Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014b) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. *Irish Wildlife Manuals*, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Wyse Jackson, P.S. (2007) The potential impact of climate change on native plant diversity in Ireland. *BG Journal,* 4(2), 26-29.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***2,900 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

<table>
<tr><td>4.9 Long-term trend Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="2">4.10 Long-term trend Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>4.11 Long-term trend Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
b) Based mainly on extrapolation from a limited amount of data
<u>c) Based mainly on expert opinion with very limited data</u>
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">4.12 Favourable reference range</td><td colspan="2">a) 2,900 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">There is no evidence of loss of range since the Directive came into force.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 8120 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool.
The reported range of 29 occupied 10x10 km grid cells is one cell higher than that reported in NPWS (2019). This does not represent a genuine increase in the range of the habitat but is a result of improved knowledge of the distribution of the habitat.
New data added this reporting period extended the 10x10 km grid cell distribution of the 8120 habitat by one grid cell (M34), with a point added for 8120 habitat on Knockma Hill, near Tuam in East Galway.</td></tr>
</table>

	Short-term trend was estimated based on the current reporting period and the previous reporting period (NPWS, 2019). While there is limited data on this habitat, with only one NSUH site with 8120 habitat surveyed since 2013 (Perrin *et al*., 2014a), there is no evidence of loss of habitat. Therefore, the short-term trend of Range is assessed as *stable*. Similarly, the long-term trend is assessed as *stable*, as there is no evidence of loss, albeit based on limited data. Favourable Reference Range is equal to the current range. No loss of range has occurred since the Directive came into force, and it is considered that the range when the Directive came into force is sufficient to include the full range of ecological variation of the habitat. The range is also regarded as large enough to ensure that the habitat survives in the long term.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1975-2022***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.883 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	

5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km^2*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	

<table>
<tr><td rowspan="5"></td><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force
Optional</td><td colspan="2">There is no evidence of loss of area since the Directive came into force.</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The surface area of the habitat was determined over a period beginning in 1975, when original survey work for the Habitat Assignment Project commenced, and incorporates updates made by surveys up until 2022. A full list of these resources is presented in section 3.4.

Area was calculated from the polygon shapefile and point shapefile used for distribution. All 8120 points located more than 20 m from 8120 polygons had an area of 400 m^2 applied. This point area (m^2) was used during previous reporting periods and carried over to the current reporting period to maintain consistency.

Surface area of the 8120 habitat has increased from 0.882 km^2 in NPWS (2019) to 0.883 km^2 this reporting period. Sources attributed to this increase comprise: Hodd et al. (in prep.) and R.L. Hodd (personal records). These additions represent previously unmapped 8120 habitat rather than genuine increases in 8120 surface area.

More detailed survey work of the 8120 habitat is needed, and it is expected that the area listed in section 5.2 will be refined as more in-depth mapping of the 8120 habitat is completed. In particular, any area represented within the dataset by only a point needs to be surveyed in more detail. In addition to refining the areas of 8120 habitat currently known, there are probably still areas of unmapped 8120 habitat within the country. The area value entered is therefore a minimum.

Of the datasets used to map the 8120 distributions, loss of area was only fully assessed during National Survey of Upland Habitats (NSUH) surveys. Any conclusions regarding area loss are tentative and at a low level of confidence.

The 8120 habitat was recorded from six of the twenty-one NSUH sites surveyed to date (Perrin et al. 2011, 2013a-c, 2014a). Area loss assessments were conducted for all six sites, with these sites representing 70.8% of the mapped 8120 habitat nationally.

The default trend periods are presented above and are used to calculate the magnitude of annual loss.</td></tr>
</table>

	Short-term trend direction for Area was determined to be *stable*. Since 2013, at the sample of sites covered by the NSUH (Perrin *et al.* 2014a), there were no recorded losses of 8120 habitat. Similarly, no gains in habitat were noted within this time period. Long-term trend direction for Area was determined to be *stable* overall. Since 2000, there were losses in 8120 habitat recorded from one NSUH site, Ben Bulben, Gleniff and Glenade Complex SAC (000623). Losses of <0.01 ha were attributed to tracks and activities associated with quarrying. However, there were also minor gains of <0.01 ha at the same site between 2005-2012, due to landslides. The overall nett loss of habitat area at this site was less than 1% per year (Perrin *et al.* 2013a). Scaled up to a national level, Area was assessed as *Favourable* in the previous reporting periods (NPWS, 2019; NPWS 2013b), as the loss of habitat was so small that it did not impact on the Favourable Reference Area (FRA). Although the loss is not considered to be significant at a national scale, small losses in area at the site level are important and conservation measures should be implemented to counteract these losses. Favourable Reference Area (FRA) is deemed to be approximately equal to the current area. There is no information to indicate that an enlarged area is necessary either for typical species to reach favourable conservation status or for the necessary structures and functions to exist, therefore the surface area of the habitat when the Directive came into force in 1994 is taken to be the FRA. While this figure is unknown, it is deemed to be approximately equal to the current area as there is no evidence of significant declines since this time.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.59 km²***
		Maximum	***0.59 km²***
	b) Area in not-good condition	**Minimum**	***0.29 km²***
		Maximum	***0.29 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		

6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	Typical indicator species for 8120 habitat are: *Asplenium adiantum-nigrum, Asplenium ruta-muraria, Asplenium trichomanes, Asplenium viride, Carex pulicaris, Asplenium ceterach, Cystopteris fragilis, Dryas octopetala, Geranium lucidum, Geranium robertianum, Hieracium* spp., *Koeleria macrantha, Oxalis acetosella, Phegopteris connectilis, Polystichum aculeatum, Polystichum lonchitis, Polystichum setiferum, Saxifraga aizoides, Saxifraga oppositifolia, Silene acaulis, Teucrium scorodonia, Thalictrum alpinum* and *Tortella tortuosa.*
6.8 Additional information *Optional*	Perrin *et al.* (2014b) sets out the standard guidance for assessing Structure and functions at a monitoring stop level using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure; all criteria need to pass for a stop to pass. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. Although five NSUH sites were surveyed during this reporting period, no 8120 habitat was mapped, and therefore no monitoring stops within 8120 habitat were recorded. Similarly, no monitoring stops were recorded during the previous reporting period (NPWS, 2019). It was, therefore, necessary to include assessments from NPWS (2013b) to give an overview of the national Structure and functions. There is no evidence that the condition of 8120 habitat has significantly improved or declined, so the assessment results from NPWS (2013b) should still be representative. Following analysis of fifteen 8120 monitoring stops, NPWS (2013b) assessed 66.7% of stops as in good condition and 33.3% as in not-good condition. Scaled up to the national area of habitat, this equates to 0.59 km² of 8120 habitat in good condition and 0.29 km² in not-good condition. These figures were taken as the minimum and maximum area in good condition and the minimum and maximum area in not-good condition, respectively. The most frequent criteria to fail the Structure and functions assessment were 'number of indicative ferns and *Saxifraga* species' (26.7%), 'number of positive indicator species' (26.7%), 'disturbed ground in the local vicinity' (16.7%) and 'proportion of vegetation composed of non-native species' (13.3%) (NPWS, 2013b).

	Similar to NPWS (2019), the short-term trend of habitat area in good condition is assessed as *stable* based on expert opinion, as there is no evidence that the status has declined.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	Low
PE01 Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Minority <50%	Low
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R05653 *Epilobium brunnescens* R02717 *Capra hircus*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures and threats were sourced from: NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union, 1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services.
7.4 Additional information *Optional*	For the current reporting period, no data on pressures were available as none of the NSUH sites surveyed supported 8120 habitat. Similarly, no data on pressures were available from sites surveyed during the previous reporting period (NPWS, 2019). In light of the lack of

	available data, as per NPWS (2019), the pressures and threats reported here are primarily based on NPWS (2013b). PA07 'Intensive grazing or overgrazing by livestock' was reported as a high-influence pressure in NPWS (2019, 2013b). Overgrazing by sheep can damage 8120 vegetation, cause erosion and lead to nitrogen enrichment. NPWS (2013b) stated that "whilst grazing impacts on the existing vegetation were generally assessed as low, sheep tracks across scree slopes with associated erosion were noted" and "chronic levels of unsuitable grazing pressure may have removed indicator species from some areas". Based on expert opinion (given that large areas of scree are often inaccessible to grazers) and taking the above statement from NPWS (2013b) into consideration, PA07 was reassessed a medium-influence pressure this reporting period. Low-influence pressures in NPWS (2019, 2013b) that were retained as low influence this reporting period comprise: PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)', PE01 'Roads, paths, railroads and related infrastructure', PI02 'Other invasive alien species (other than species of Union concern)' (e.g. *Epilobium brunnescens* and, especially in the Burren, feral goats) and PK03 'Mixed source air pollution, air-borne pollutants'. Climate change (PJ) was ranked as a low-importance threat in NPWS (2019, 2013b). It is predicted to impact on the occurrence of arctic-alpine plants in Ireland (EPA, 2017; Hodd *et al.*, 2014; Wyse Jackson, 2007) some of which are found in high-quality examples of this habitat. Increases in extreme rainfall events from climate change (PJ03) could potentially lead to greater scree instability and more erosion, which may impact the vegetation growing on the scree slopes. Predicted increases in temperatures and periods of drought may also impact this habitat through desiccation/reduction of humidity levels (PJ01). Without more habitat-specific quantitative research, it is very difficult to predict the timeframe for significant effects of climate change to manifest, and small but incremental changes are likely already occurring. Until further information including botanical and climate monitoring data is available, climate change is retained as a low-influence pressure, although in the longer term it is likely to be a more significant pressure and threat. To investigate the impact of burning during the current reporting period, an EFFIS burnt area shapefile for the Republic of Ireland based on MODIS imagery was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile captures large burns greater than 30 ha in size. Care must be taken when interpreting the results, as smaller burnt areas below the spatial resolution of the MODIS imagery are not mapped. This shapefile mapped 308 large fire events in the Republic of Ireland covering 18,590 ha. The 8120 polygon and point distribution shapefiles were intersected with the EFFIS burnt area shapefile. Analysis indicates that none of the mapped 8120 habitat areas were subject to a large burn event this reporting period. PA09 'Burning for agriculture' and PH04 'Vandalism or arson (incl. human-introduced wildfire)' were not added as 8120 habitat pressures for the current reporting period, however, they were added as low-influence threats.

	PF05 'Sports, tourism and leisure activities' (e.g. walking and bouldering) was listed as a low-importance threat in NPWS (2019, 2013b) and has been retained as a low-influence threat for the current reporting period.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)
8.7 Additional information *Optional*	There are no targeted conservation measures currently in place specifically for 8120 habitat and any effects of measures on this habitat are incidental. Agricultural measures likely having a positive effect on this habitat are MA03 'Maintain existing extensive agricultural practices and agricultural landscape features' and MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', with the extent of the impact of these measures on 8120 habitat unknown. The primary scheme which may have some positive impacts is the Agri-Climate Rural Environment Scheme (ACRES), which is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high-priority geographical areas are included under ACRES Co-operation Project (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. Given the wide scope and geographical spread of ACRES, it is likely that there are some benefits for 8120 habitat through regulation and the promotion of sustainable grazing practices. The extent and magnitude of these benefits are unknown since these measures are not specifically targeted for the 8120 habitat. Additional monitoring will be required to assess their impacts. The 8120 habitat would benefit from the wider implementation of adapted grazing (MA05, MA06), planning to reduce the impacts of paths/tracks (ME01) and other recreational impacts (MF03), as well as implementation of MI03 to target invasive plants such as *Epilobium brunnescens* (if control of this species is viable) and/or wider management of non-native grazers (as required). Additional research on this habitat, along with enhanced monitoring (e.g. nitrogen deposition impacts, climate impacts), is necessary to ensure effective conservation into the future.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable.* Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected. Future prospects of Range is therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is approximately equal to the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected. Future prospects of Area are therefore *Good*. Short-term trend direction is *stable* for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable* as <90% of habitat is in good condition. A maximum estimate of 33.3% of 8120 habitat is in poor condition, which would equate to an *Unfavourable-Bad* assessment for Structure and functions. However, due to insufficient data during the current reporting period, this 33.3% was carried over from NPWS (2019, 2013b). Both NPWS (2019) and NPWS (2013b) indicated an *Unfavourable-Inadequate* assessment was more appropriate on the basis of "an imprecise understanding of the ecology of the habitat and the requirement to review the assessment criteria". The assessment of *Unfavourable-Inadequate* has been retained for the current reporting period. The conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *stable*. Although the threat of overgrazing is expected to have a negative influence on Structure and functions, this threat is not expected to change the overall status of Structure and functions within the next 12 years. Where the conservation measures, MA03 and MA05 are implemented, these would be expected to result in a reduction of the impacts of overgrazing. However, it should be noted that these are not targeted measures for the 8120 habitat, nor are they be implemented across the national distribution of the habitat. Currently there is no plan to tackle invasive non-native species (MI03) within this habitat. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of the Structure and functions and Future prospects are *Unfavourable-Inadequate* in this reporting period, as they were in the previous reporting period. The Overall assessment of Conservation Status was assessed as *Unfavourable-Inadequate*, as it was during the last reporting period. The status of *Unfavourable-Inadequate* during the current reporting period was due to <90% of the area of 8120 habitat being assessed as having good (*Favourable*) Structure and functions. Trend in Overall assessment of Conservation Status was assessed as *stable* in this reporting period, as it was during the last reporting period.	

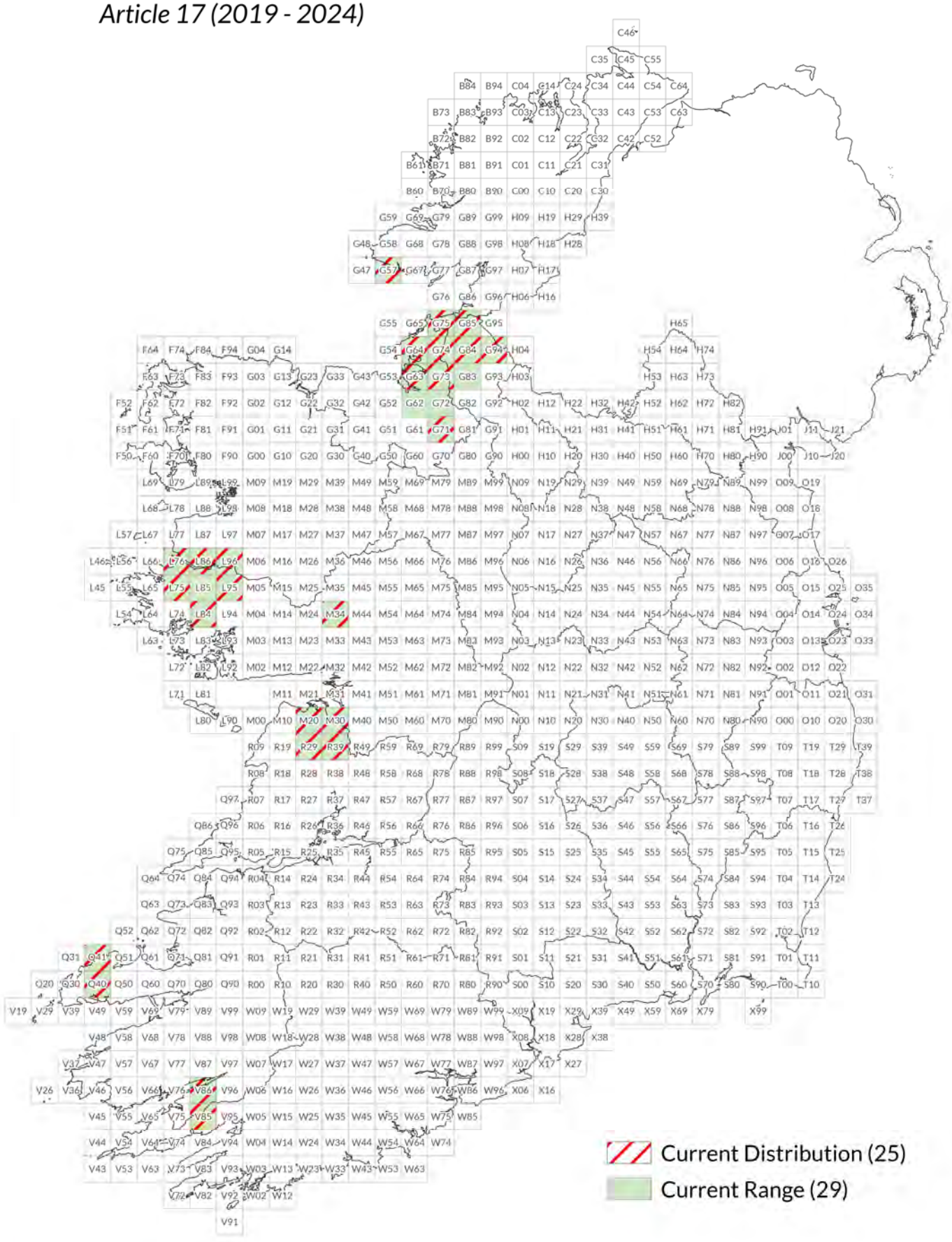
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.70 km²***
11.2 Type of estimate	*Best estimate / 95% confidence interval /* ***minimum***	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 8120 habitat in SACs in the country, including some SACs where 8120 is not listed as a qualifying interest (QI). The area of 8120 habitat within the SAC network where it is listed as a QI is 0.69 km^2.	

	No anthropogenic loss of 8120 habitat was reported in the current reporting period. The surface area of 8120 habitat within the SAC network has not changed since the last reporting period. The short-term trend of the 8120 habitat in good condition within the SAC network is taken to be *stable*, with the same trend as the 8120 habitat nationally (section 6.4).

12 Complementary information *N/A*

Calcareous scree (8120)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**8210 Calcareous rocky slopes with chasmophytic vegetation**
1.2i Habitat short name	**Calcareous rocky slopes**
1.3i Habitat description	The habitat 8210 calcareous rocky slopes is defined as chasmophytic vegetation occurring in crevices, cracks and overhangs of rock where there is a calcareous influence. The bedrock can be strongly basic limestone, as well as sandstone or other siliceous rocks, where base-rich water is flushed out of localised bands of rock with higher base content. This habitat also occurs on rocks of metamorphic origin, for example mica schist and Connemara marble. 8210 habitat is limited to a broadly upland context and excludes areas of rockface vegetated with heath, grassland or tall herbs. The key characteristic indicator species of this habitat are calcicole fern and saxifrage species, including the ferns *Asplenium viride, A. trichomanes, Polystichum lonchitis* and *Cystopteris fragilis* and the saxifrages *Saxifraga oppositifolia* and *S. aizoides.* Saxicolous bryophytes are also an important component of this habitat, with characteristic species including *Tortella tortuosa, Neckera crispa* and *Orthothecium rufescens*. Although not currently on the list of indicator species, the mosses *Amphidium mougeotii* and *Anoectangium aestivum* are strongly indicative of this habitat where the substrate is primarily siliceous. 8210 habitat is referable to the IVC communities (Perrin, 2024) RH1A *Asplenium trichomanes – Ctenidium molluscum* crevice community and RH2D *Angelica sylvestris – Breutelia chrysocoma* ledge community. A range of rare and protected vascular plant and bryophyte species are restricted, or almost restricted, to this habitat in Ireland including *Micranthes nivalis, Cardaminopsis petraea, Encalypta rhaptocarpa, Myurella julacea* and *Gymnomitrion coralloides.* The presence of arctic-alpine species is not a requisite, but they are an indicator of high-quality examples of the habitat.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1959-2020***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*

2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was generated using a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 8210 or Fossitt code ER2 (Fossitt 2000), or a relevant NPWS or Irish Vegetation Classification (IVC) habitat code. Data were added from the following sources for the current reporting period: Hodd *et al*. (2022 a,b), Hodd *et al*. (in prep.), Scott Cawley (2021), R.L. Hodd (personal records), NPWS local files. In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: Coillte Biodiversity Datasets (various dates), Hodd (2015a,b, 2016), the updated BSBI map scheme records up to 2018, twelve National Survey of Upland Habitats (NSUH) sites (Perrin *et al.* 2011, 2012, 2013a-e, 2014 a,b, Roche *et al.* 2009, 2010a, 2012), Barron & Perrin (2010), Burren National Park Habitat Maps, National Biodiversity Data Centre (NBDC) biodiversity data (species records - with the earliest date of the species records data used being 1959), NPWS (2013a), NPWS Habitat Assignment Project, R.L. Hodd (pers. comm.) and Webb & Scannell (1983). All references are detailed below in section 3.4. All data informing the distribution map were assigned a certainty rating from 1, for low certainty, to 3, for high certainty. For this round of reporting, all new sources were assigned a certainty rating of 3, as they were either collected during targeted surveys of upland habitats or are based on observations by an expert recorder who is highly familiar with the habitat. All polygons and points with certainty rating 1 to 3 were used to map the distribution of the 8210 habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	***New datasets incorporated into the distribution maps this reporting period:*** Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick

	South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L. Personal records used to populate the 8210 habitat point distribution shapefile. Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG. **Datasets included in NPWS (2019) and retained for the distribution maps this reporting period:** Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. BSBI Maps Scheme: https://database.bsbi.org/maps/. For the previous reporting period (NPWS 2013b) hectads were included where the online BSBI Maps Scheme indicated records for any of the following species since 1987: *Saxifraga oppositifolia, Saxifraga aizoides, Asplenium viride, Polystichum lonchitis* and *Alchemilla alpina.* Hectads were included as centroids for the relevant squares in the point shapefile. These points were carried through for this reporting period, with one additional record for *Polystichum lonchitis*, recorded post-2010, included. Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and pNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Hodd, R.L. (2015a) Survey of Flora Protection Order Bryophytes 2015. Unpublished report to National Parks and Wildlife Service, Dublin, Ireland. Hodd, R.L. (2015b) Survey of Flora Protection Order Bryophytes in Cork and Kerry (H1-H5). Unpublished report to National Parks and Wildlife Service, Dublin, Ireland. Hodd, R.L. (2016) Survey of Flora Protection Order Bryophytes 2016. Unpublished report to National Parks and Wildlife Service, Dublin, Ireland. National Biodiversity Data Centre (NBDC) online database. In the previous reporting periods hectad records of *Orthothecium rufescens* were included as centroids for the relevant squares in the point shapefile. These points were carried through for this reporting period. NPWS (2013a) Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp). Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010 - 2012) Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932), Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. Perrin, P.M., Roche, J.R., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No.

7: Mount Brandon cSAC (000375), Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013a) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 10: Ox Mountains Bogs cSAC (002006), Cos. Mayo and Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013b) National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 11: Ben Bulben, Gleniff and Glenade Complex cSAC (000623), Co. Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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Roche, J.R., Perrin, P.M. & Barron, S.J. (2009) National Survey of Upland Habitats (Pilot Survey Phase, 2009-2010), Site Report No. 2: Corraun Plateau cSAC (000485), Co. Mayo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2010a) National Survey of Upland Habitats (Pilot Survey Phase, 2009-2010), Site Report No. 3: Comeragh Mountains cSAC (001952), Co. Waterford. National

Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Roche, J.R., Perrin, P.M., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 9: Galtee Mountains cSAC (000646), Cos. Tipperary and Limerick. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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Hodd, R.L., Bourke, D. & Sheehy Skeffington, M. (2014) Projected Range Contractions of European Protected Oceanic Montane Plant Communities: Focus on Climate Change Impacts Is Essential for Their Future Conservation. *PLoS ONE,* 9(4), e95147. doi: 10.1371/journal.pone.0095147.

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4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***13,900 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 13,900 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available: high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">There is no evidence of loss of range since the Directive came into force.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool, based on the current known distribution of the 8210 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool.

The reported range of 139 occupied 10x10 km grid cells is 15 cells higher than that reported in NPWS (2019). This does not represent a genuine increase in the range of the habitat but is a result of improved knowledge of the distribution of the habitat. Additional grid cells have been added to the range on the Inishowen Peninsula in North Donegal, on Achill Island in North Mayo, in the Slieve Aughty Mountains in East Clare and Southeast Galway, and on the Cooley Peninsula in Louth. The additions to the distribution in the Slieve Aughty Mountains results from NSUH surveys (Hodd et al., 2022a,b), while the other additions result from observations by reliable, expert recorders.

Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Although there are limited data on this habitat for the current reporting period, with only two NSUH sites containing the habitat surveyed, there is no evidence of loss of habitat. Therefore, the short-term trend is assessed as stable. Similarly, the long-term trend is assessed as stable, as there is no evidence of loss, albeit based on limited data.

Favourable Reference Range is equal to the current range. This is higher than that reported in the previous period, reflecting the increased knowledge of the range and distribution of 8210 in Ireland, rather than a genuine change. No loss of range has occurred since the Directive came into force and it is considered that the range when the</td></tr>
</table>

	Directive came into force is sufficient to include the full range of ecological variation of the habitat. The range is also regarded as large enough to ensure that the habitat survives in the long term.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1975-2022***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.81 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	

5.9 Short-term trend **Magnitude** **Type of estimate**		
5.10 Short-term trend **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend **Period** *Optional*	***2000-2024***	
5.12 Long-term trend **Direction** *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend **Magnitude** *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend **Method used** *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km²*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ ***approximately equal to the favourable reference area (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available:* *high/**moderate**/low*
	☐ ***Expert opinion***	

	☐ *Other (Elaborate in Additional information 5.17)*
5.16 Surface area when Directive came into force *Optional*	There is no evidence of loss of area since the Directive came into force.
5.17 Additional information *Optional*	The surface area of the habitat was determined over a period beginning in 1975, when original survey work for the Habitat Assignment Project commenced, with most data included collected after 2000, the most recent data originating from 2022. Points representing hectad species records (dating from 1959 onwards) did not contribute to area. The calculation of area was based on the distribution point and polygon shapefiles. Area was assigned to points based on the methodology established in previous reporting periods, to maintain consistency, with a number of deviations, based on expert opinion. For each point not intersecting with a polygon that was yielding an area, and located outside of a designated area, an estimated area of 100 m^2 of habitat was assigned. This was based on expert opinion applied in previous reporting periods and carried over to this reporting period. For points representing 8210 habitat within a designated site, a habitat percentage of 0.01% was used (in the case of multiple points within one SAC, only one point was assigned area); this estimate is based on the mean percentage coverage of 8210 habitat within sites surveyed by the NSUH. More details are contained in NPWS (2013b). Three datasets, containing polygons within which a percentage area of 8210 habitat was recorded, were added for the current reporting period. Two of these derive from NSUH surveys (Hodd et al., 2022a,b) which surveyed the entirety of Glendree Bog SAC (001912) and Loughatorick South Bog SAC (000308). The third dataset (Scott Cawley, 2021) originates from a survey of an area within the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365). As no polygons for habitat 8210 previously existed for SAC 000365, though multiple points did, an area of 0.01% of the SAC area was assigned to one of these points when calculating habitat area for the previous assessment. As this is a very extensive SAC, with 8210 at multiple locations across its area, and with polygons only recorded within a small area, the 8210 habitat area previously assigned to the point was retained, in addition to the area calculated from the newly recorded polygons, to give a potentially more accurate reflection of the area of 8210 habitat present. Four newly added points occur within SACs that previously had no area assigned. For two of these SACs, North Inishowen Coast SAC (002012) and River Finn SAC (002301), an area of 0.01% of the SAC was assigned, following the methodology outlined above. The methodology was deviated from in two instances, where points occurring within an SAC were assigned an area of 100 m^2 rather than 0.01% of the SAC area. In both instances, these points occur within SACs (001955 Croghaun/Slievemore SAC and 000453 Carlingford Mountain SAC) that have previously been surveyed and mapped in full by the NSUH, and with no areas of 8210 recorded (Roche *et al*., 2010b, 2011). Habitat corresponding to the definition of 8210 was subsequently observed within both SACs by reliable recorders in small quantities at single localities, and was likely overlooked by the NSUH surveys due to its

	extremely localised distribution within the SACs. Therefore, it was considered that assigning 0.01% of the SAC area to the habitat in both instances would be an overestimate. No loss in area of 8210 has been recorded from any source during the current reporting period and no evidence of loss has been found. As there is no monitoring network of 8210 in place and only a small amount of this habitat was surveyed between 2019 and 2024, any conclusions regarding area loss are tentative and at a low level of confidence. The area figure calculated is 0.29 km^2 lower than the area reported for the period 2013–2018. This decrease in the area reported is due to the detection of a calculation error in the area assigned to Wicklow Mountains SAC, which was corrected from 330,567.75 m^2 to 33,220.42 m^2. As a large proportion of this habitat has not been mapped in detail, the area figure reported can only be considered an estimate and may be either an over- or underestimation. Therefore, although the area figure was reported as 'minimum' for the 2013-2018 period, it is here reported as 'best estimate'. The method of calculation where little data exist may have resulted in overestimations of area in some places, but this is likely to be balanced against unmapped areas of 8210, particularly in the western coastal counties of Donegal, Mayo, Galway and Kerry, where many areas of 8210 habitat are only represented by points, or potentially remain to be discovered. Further survey work is needed to refine the area figure and establish the true extent of 8210 habitat present. As there is no evidence of a loss of area, and any increases in the area of 8210 habitat reported over the past two reporting periods are due to improved knowledge, the short-term trend is considered *stable*. Similarly, there is no evidence of any changes in area since 2000, so the long-term trend is also considered *stable*. Favourable Reference Area (FRA) is deemed to be approximately equal to the current area. The surface area of the habitat when the Directive came into force in 1994 is unknown, but there is no reason to believe that it has significantly changed in the intervening period. As the extent of this habitat is limited primarily by geology and topography, there is limited scope for significant expansion of area.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***1.79 km²***
		Maximum	***2.19 km²***
	b) Area in not-good condition	**Minimum**	***0.62 km²***
		Maximum	***1.01 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data***		

	c) Based mainly on expert opinion with very limited data *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	Typical indicator species for 8210 habitat are: *Alchemilla alpina, Asplenium adiantum-nigrum, Asplenium ruta-muraria, Asplenium trichomanes, Asplenium viride, Carex pulicaris, Ceterach officinarum, Cystopteris fragilis, Draba incana, Dryas octopetala, Hieracium* spp., *Koeleria macrantha, Neckera crispa, Orthothecium rufescens, Persicaria vivipara, Phegopteris connectilis, Phyllitis scolopendrium, Polystichum aculeatum, Polystichum lonchitis, Polystichum setiferum, Preissia quadrata, Saxifraga aizoides, Saxifraga hypnoides, Saxifraga oppositifolia, Selaginella selaginoides, Silene acaulis, Thalictrum alpinum* and *Tortella tortuosa*. Although this list covers the key indicator species, a systematic review is required, as some strong indicators of this habitat, such as *Amphidium mougeotii* and *Anoectangium aestivum*, are currently not included.
6.8 Additional information *Optional*	Structure and functions were assessed at a monitoring stop level by the NSUH (Perrin *et al.,* 2014c), using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement. The NSUH primarily assesses SACs and is currently incomplete. During the current reporting period, the focus of NSUH surveys has been on peatland sites, with only two monitoring stops recorded across two sites, where 8210 was only a very small component of the overall site. Both stops passed the assessment on all criteria (Hodd *et al.*, 2022a,b) and the Structure and functions of the habitat were assessed as *Favourable* at both sites. As these assessments cover only 0.39 ha of 8210 habitat, which is 0.1% of the national area, and the sites assessed are outside of the core area of occurrence of this habitat, these assessments cannot be taken to be indicative of the overall structure and functions of 8210 nationally. Therefore, it is necessary to include assessments from the

	previous two reporting periods to give a more accurate national overview of 8210 Structure and functions. There is no evidence that the condition of 8210 habitat at any of the sites surveyed by the NSUH since 2009 has significantly improved or declined, so the assessment results from those surveys should still be representative. If assessments from the current and previous reporting period, since 2013, are taken into account, there are a total of nine to consider. Of these, seven (77.8%) were assessed as *Favourable* and two (22.2%) as *Unfavourable*. Scaled up to the national area of habitat, this equates to 2.19 km² of 8210 habitat in good condition and 0.62 km² in 'not-good' condition. These figures were taken as the maximum area in good condition and minimum area in not-good condition, respectively. Following analysis of 25 monitoring stops from 8210 habitat, NPWS (2013b) assessed 64% of stops as being in good condition and 36% as not-good condition. Scaled up to the national area of habitat, this equates to 1.79 km² of 8210 habitat in good condition and 1.01 km² in not-good condition. These figures were taken as minimum area in good condition and maximum area in not-good condition, respectively. The most frequent criterion that resulted in the failure of a Structure and functions assessment within 8210 habitat is the 'proportion of vegetation composed of non-native species', due to the presence of *Epilobium brunnescens*. Structure and functions assessments have also failed based on the 'number of positive indicator species' and 'number of indicative ferns and *Saxifraga* species' criteria. The short-term trend of habitat area in good condition is assessed as *stable*, as the area reported as being in good condition is roughly the same as that reported for the previous period, and there is no evidence of decline. A caveat to this is that there is very little information on structure and functions deriving from the current reporting period, so the assessment is based primarily on data collected during the past two reporting periods.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA18 Agricultural activities generating air pollution	Ongoing and likely to be in the future	Minority <50%	High
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	Medium
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	Low

PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Low
PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R05653 *Epilobium brunnescens* R02717 *Capra hircus*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	As there is no information on threats to 8210 habitat originating from the current reporting period, information on threats was sourced from the assessments completed in previous reporting periods and the references contained therein: CMP (2025) NPWS Conservation Measures Programme 2022-2024. Unpublished data, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.
7.4 Additional information *Optional*	No pressures or threats were recorded in the two sites containing 8210 habitat that were surveyed by the NSUH during the current reporting period (Hodd *et al.*, 2022a,b) and no other information on pressures and threats to this habitat for this reporting period were located in other sources. Therefore, in light of the lack of available data for the current reporting period, the pressures and threats reported here are based mainly upon the pressures and threats reported upon in the previous monitoring period (NPWS 2019). PA18 'Agricultural activities generating air pollution' was retained as a high-impact pressure from the previous reporting period, as the intensity of this pressure was not considered to have changed in the

	intervening period. See NPWS (2019) for details of the rationale behind the assessment of this pressure. Two pressures and threats are considered to be having a medium impact on this habitat in Ireland. The first of these is overgrazing by extensively grazing sheep, reported here under the category of PA07 'Intensive grazing or overgrazing by livestock'. Overgrazing leads to erosion and damage to the vegetation across all upland areas of Ireland. The impact of overgrazing on 8210 habitat may be less intensive than for many upland habitats, as much of the area supporting 8210 habitat is out of reach of the majority of livestock on steep and unstable slopes. However, many parts of even the steepest rocky slope are accessible to grazing sheep, particularly close to the bottom of the slopes, and alongside ledges and gullies, where the steepness of the slope would exacerbate the grazing impact. Therefore, overgrazing is having a relatively high-intensity impact where it is impacting 8210 habitat, but the majority of the habitat is subject to little or no impact. Therefore, on a national scale, an influence of medium is deemed appropriate. Non-native feral goats would also graze on rocky slopes, and would be able to access more of this habitat than sheep, but the extent or intensity of their impact on 8210 is not known. If grazing intensity were decreased where this habitat is being heavily impacted by grazing, it is likely that the habitat would undergo a small expansion of area on a local scale. Undergrazing is not considered an impact on this habitat, as it does not require any grazing for its maintenance in good condition. PI02 'Other invasive alien species (other than species of Union concern)' is also regarded as a medium-importance threat. This is in the form of *Epilobium brunnescens*, which is now almost ubiquitous across stands of this habitat in Ireland, which was the primary reason for plots failing Structure and functions assessments, as detailed in section 6.8 above. However, although it is common throughout this habitat, it is a small and low-growing species and is likely to be only having a minimal impact on the species composition and overall structure of the vegetation. Therefore, it is not warranted to regard this as a high-intensity impact. The remaining impacts are reported as having a low influence on 8210 habitat, although in most cases the data do not exist to fully assess the impact. There is a possibility that PM07 'Natural processes without direct or indirect influence from human activities or climate change' may be having a more significant impact than that reported in previous monitoring periods, with an analysis of the intersection between polygons containing 8210 habitat and recorded landslides (using data from GSI, 2024) showing potentially widespread overlap. However, considering that 8210 habitat often only occupies a small proportion of polygons within which it occurs, it is not known whether there is a genuine overlap. Therefore, PM07 can only be considered a low-intensity impact. Similarly, no direct evidence exists of the impact of PK03 'Mixed source air pollution, air-borne pollutants' and PJ 'Climate change' on this habitat, but impacts may be occurring undetected. Climate change has been projected to impact the rarer and more restricted characteristic species of this habitat in the future (Wyse Jackson,

	2007; Hodd *et al.*, 2014), through rising temperatures and other factors (PJ01), but no evidence of this occurring has been searched for as yet. It is also possible that climate change might lead to more frequent and widespread rockfalls, landslides and other erosion events (PJ09), through increased frequency of intense rainfall events (PJ03). PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)' and PF05 'Sports, tourism and leisure activities' have been noted as having an impact on this habitat on a small, localised scale in previous reporting periods and have been retained as low-influence impacts. PA09 Burning for agriculture is also retained as a low-influence impact for this reporting period. The code PH04 'Vandalism or arson (incl. human-introduced wildfire)' was added as a low-influence pressure this reporting period. Although burning is a marginal threat to most stands of this habitat, there is a possibility of fire spreading from adjacent habitats and damaging this habitat in places, with one possible incident noted during the 2007-2012 reporting period (NPWS, 2013b).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* *d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')*

	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)
8.7 Additional information *Optional*	Conservation measures are selected based on NPWS (2019) and expert opinion. No targeted conservation measures are currently in place specifically for 8210 habitat and any effects of measures on this habitat are incidental. At present, the only measures that are likely to be having an effect on this habitat are MA03 'Maintain existing extensive agricultural practices and agricultural landscape features' and MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', with the extent of the impact of these measures on 8210 habitat unknown. A range of agri-environmental schemes are in operation in the Irish uplands, the majority of which are targeted at peatlands and would be unlikely to impact 8210 habitat. The primary scheme which may have some positive impacts is the Agri-Climate Rural Environment Scheme (ACRES), which is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high-priority geographical areas are included under ACRES Co-operation (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. Given the wide scope and geographical spread of ACRES, it is likely that there are some positive benefits for 8210 habitat, through regulation and reduction of sheep grazing. As these measures are not specifically targeted at 8210 habitat, and due to the cyclical nature of agri-environmental schemes, these measures may only result in a temporary improvement of the habitat condition.

	The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Microsoft Excel spreadsheet was reviewed for measures associated with the 8210 habitat. One measure was listed that it is thought may have a positive impact on 8210 habitat. That is MA06, in the form of replacement of fencing to prevent sheep from trespassing in areas of the Connemara National Park (CMP, 2025). The extent of 8210 habitat impacted by this measure is unknown. Targeted measures are required for this habitat. A reduction in grazing intensity, or exclusion of grazing livestock from alongside cliffs supporting 8210 habitat is likely to improve the quality of this habitat and increase its area on a local scale. Structure and functions of the habitat would be improved by implementing the measure MI03 'Management, control or eradication of other invasive alien species' in the form of developing a management strategy for the control of *Epilobium brunnescens*. However, in practice this may prove to be a time-consuming and ultimately unsuccessful task, due to the small size of *E. brunnescens* and ubiquity throughout a range of habitats from which it can easily recolonise areas where it has been removed from. Further research into this habitat, as well as increased monitoring, is required to enable its efficient conservation into the future.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current area is approximately equal to the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected. Future prospects of Area are therefore *Good*. Short-term trend direction is *stable* for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable* as < 90% of habitat is in good condition. Based on available data from the current and previous reporting periods, it is estimated that somewhere between 22.2% and 36.4% of 8210 habitat is in poor condition, which would equate to an *Unfavourable-Bad* assessment for Structure and functions. In previous reporting periods, it was determined that an *Unfavourable-Inadequate* assessment was more appropriate as there is a lack of knowledge on the threat posed by *Epilobium brunnescens,* which is the primary reason for stops failing the Structure and functions assessments. No new information has been gathered on this threat or other threats during this reporting period, and threats and pressures have been carried over from the	

	previous reporting period, so *Unfavourable-Inadequate* was retained for this reporting period. The conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future trend of Structure and functions is assessed as *negative*, as the threat of overgrazing (PA07) is expected to have an ongoing influence on structure and functions, as any potential positive impacts of conservation measures are incidental and not guaranteed in the future. The main driver of poor structure and functions, invasion of 8210 habitat by *Epilobium brunnescens*, is not currently being addressed and there is no plan in place to tackle this threat. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Favourable* in this reporting period, as it was in the previous reporting period.	

	The Conservation Status of the Structure and functions and Future prospects are *Unfavourable-Inadequate* in this reporting period, as they were in the previous reporting period. The Overall assessment of Conservation Status was assessed as *Unfavourable-Inadequate*, as it was during the last reporting period. The status of *Unfavourable-Inadequate* during the current reporting period was due to <90% of the area of 8120 habitat assessed as having good (*Favourable*) Structure and functions. Trend in Overall assessment of Conservation Status was assessed as *stable* in this reporting period, as it was during the last reporting period.

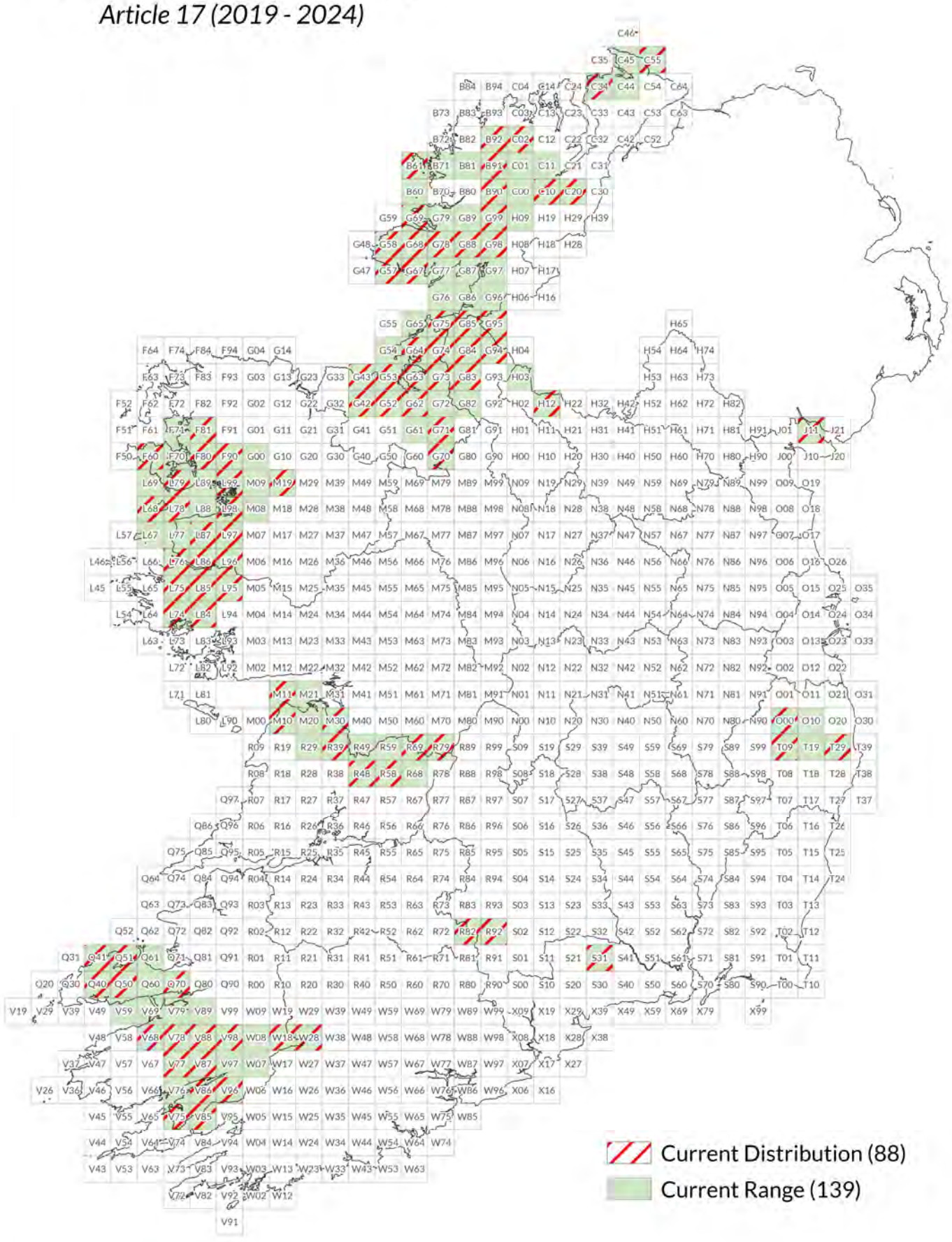
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.31 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a)*** ***stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	

11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 8210 habitat in SACs in the country (82% of total area), including some SACs where 8210 is not listed as a qualifying interest (QI). The area of 8210 within the SAC network where it is listed as a QI is 1.92 km^2, 83.2% of the total area within SACs. No anthropogenic loss of 8210 habitat was reported in the current reporting period, although no data are available to confirm or refute this. The short-term trend of 8210 habitat in good condition within the SAC network is taken to be *stable*, following the national trend in section 6.4. The surface area of 8210 habitat within the SAC network is 0.28 km^2 smaller than that which was reported for the 2013-2018 period. This is due to the correction of an error in the area of habitat within the Wicklow Mountains SAC, as detailed in section 5.17.

12 Complementary information *N/A*

Calcareous rocky slopes (8210)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**8220 Siliceous rocky slopes with chasmophytic vegetation**
1.2i Habitat short name	**Siliceous rocky slopes**
1.3i Habitat description	Guidance on interpretation of 8220 Siliceous rocky slopes habitat in an Irish upland context has been provided by Perrin et al. (2014c). It comprises vertical or near vertical exposures of siliceous bedrock with clefts, crevices, fissures, and overhangs that support chasmophytic vegetation. While there is no strict lower altitudinal threshold, this habitat is interpreted as referring to examples of chasmophytic vegetation occurring in a broadly upland landscape context. The vegetation is characterised by calcifuge ferns (e.g. *Dryopteris dilatata* and *Hymenophyllum wilsonii*), saxifrages (especially *Saxifraga spathularis* in the west and south) and saxicolous bryophytes (e.g. *Isothecium myosuroides* and *Diplophyllum albicans*) that require moist, shaded, infertile microhabitats. The habitat may include communities with affinities to the *Androsacion alpinae* association. According to the Irish Vegetation Classification (IVC) of Perrin (2024), most examples of the *Hymenophyllum wilsonii – Isothecium myosuroides* crevice community (RH2A) correspond to 8220 habitat and elements of the *Angelica sylvestris – Breutelia chrysocoma* ledge community (RH2D) can also occur, where there is some seepage of water. This is a highly important habitat for bryophytes, with upland siliceous rocks supporting many rare and threatened species (Lockhart *et al.*, 2012). Note that areas of heath, grassland or tall herb communities growing on rock faces or ledges are not included in 8220 habitat and while the presence of arctic-alpine species indicates high-quality examples of the habitat, they are not deemed an essential requisite.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1975-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution map was generated using a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 8220 or Fossitt code ER1 (Fossitt, 2000), or a relevant NPWS or Irish Vegetation Classification (IVC) habitat code. Data were added from the following sources for the current reporting period: four National Survey of Upland Habitats (NSUH) sites (Barron *et al.* 2022a, 2022b; Hodd *et al.* 2022a, 2022b), Hodd *et al.* (2023), Hodd (2023), Scott Cawley (2021) and R.L. Hodd (personal records). In addition to these, the sources utilised for the distribution map from the last reporting period (NPWS, 2019) that were included comprise: 15 sites from the NSUH (*Perrin et al.* 2011, 2012, 2013a-e, 2014a, 2014b; Roche *et al.* 2009, 2010a, 2010b, 2011a, 2011b, 2012a), Coillte Biodiversity Dataset (various dates), Hodd (2015a, 2015b, 2016), Perrin (2024), O'Neill *et al.* (2020), Barron & Perrin (2011), Ballycroy, Connemara and Glenveagh National Park Habitat Maps, NPWS (2007, 2013a), the NPWS Habitat Assignment Project (original survey work for the Habitat Assignment Project commenced in 1975) and aerial photograph interpretation in consultation with NPWS. All references are detailed below in section 3.4. A certainty rating system was applied to all data that informed the distribution map. This system utilised the range of 1 to 3, whereby 3 is the highest certainty and 1 the lowest certainty that the feature represents the habitat. Certainty levels are primarily based on survey method, with walkover surveys typically having high certainty and remote and older surveys having lower certainty. For this round of reporting, all new sources added were assigned a certainty rating of 3, as they were either collected during targeted surveys of upland habitats or are based on observations by an expert recorder who is highly familiar with the habitat. All data sources with a certainty of 1 to 3 were used to map the distribution of the habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	**New datasets incorporated into the distribution maps this reporting period:** Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks

	and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Barron, S.J., Hodd, R.L. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 18: Sonnagh Bog SAC (001913), Co. Galway. National Parks and Wildlife Service, DHLGH, Dublin, Ireland. Brophy *et al.* (in prep.) National Fen Survey 2021-2025. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Hodd, R. (2023) Habitat and botanical survey of the wild Atlantic rainforest Knockaunbaun site, Maamturks, Co. Galway. Report for Hometree, Ennistymon, Co. Clare. Hodd, R.L. Personal records used to populate the 8220 habitat point distribution shapefile. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Perrin, P.M. & Daly, O.H. (2023) The status of four uncommon grassland types in Ireland. *Irish Wildlife Manuals*, No. 1xx. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. Scott Cawley (2021) Baseline habitat mapping of the upland habitats in the MacGillycuddy's Reeks Phase 1: Meallis, Lisleibane and Coomcallee. Report to South Kerry Development Partnership CLG. **Datasets included in NPWS (2019) and retained for the distribution maps this reporting period:** Aerial photograph interpretation. For the previous reporting period (NPWS 2013b), a number of points were added for slopes on Slieve Snaght, Slieve Main, the Knockalla Mountains, Bulbin and the Urris Hills in northeast Donegal. These points were carried through for this reporting period. Ballycroy National Park Habitat Map is an NPWS project which compiled habitat data from available information. Datasets used were from 1991-2009. Barron, S. & Perrin, P. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Coillte Biodiversity Dataset. GIS files and individual site management plans were made available by Coillte. Datasets used were from 2001 to 2004.

Connemara National Park Habitat Map is an NPWS map based on aerial photographic interpretation and field visits conducted by G. Kaule from the University of Stuttgart in 2008.

Glenveagh National Park Habitat Map is an NPWS map produced in 2010 based on the NHA survey data collected between 1991 and 1994. The map is derived from the best information available at the time, site visits and aerial photograph interpretation.

Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and pNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs.

Hodd, R.L. (2015a) Survey of Flora Protection Order Bryophytes 2015. Unpublished report to National Parks and Wildlife Service, Dublin, Ireland.

Hodd, R.L. (2015b) Survey of Flora Protection Order Bryophytes in Cork and Kerry (H1-H5). Unpublished report to National Parks and Wildlife Service, Dublin, Ireland.

Hodd, R.L. (2016) Survey of Flora Protection Order Bryophytes 2016. Unpublished report to National Parks and Wildlife Service, Dublin, Ireland.

NPWS (2007) GIS shapefiles created during the 2001-2006 assessment of this habitat.

NPWS (2013a) Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

O'Neill, F.H., Long, M.P. & Hodd, R.L. (2020) Monitoring of the Annex V Clubmoss group (*Lycopodium* spp.) in Ireland 2015-2018. *Irish Wildlife Manuals*, No. 117. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P. M. (2024) *Handbook for the Irish Vegetation Classification*. Developed by BEC Consultants and funded by the National Parks and Wildlife Service. Published by the National Biodiversity Data Centre, Series No. 38. December 2024.

Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase 1, 2010 - 2012) Site Report No 1: Mweelrea, Sheeffry, Erriff Complex cSAC (001932), Co. Mayo. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 7: Mount Brandon cSAC (000375), Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013a) National Survey of Upland Habitats (Phase 3, 2012-2013), Site Report No. 10: Ox Mountains Bogs cSAC (002006), Cos. Mayo and Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013b) National Survey of Upland

Habitats (Phase 3, 2012-2013), Draft Site Report No. 11: Ben Bulben, Gleniff and Glenade Complex cSAC (000623), Co. Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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GSI (2024) IE GSI Landslide Extents 5K IE32 ITM. Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence. Accessed from: https://ga.geohive.ie/datasets/6d40adadb5454f4c842ca01ec39f5a8c_1/explore.

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	8: Killarney National Park, Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Wyse Jackson, P.S. (2007) The potential impact of climate change on native plant diversity in Ireland. *BG Journal,* 4(2), 26-29.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***19,800 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 19,800 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of Range since the Directive came into force.	

4.14 Additional information *Optional*	Range was calculated using the range tool, based on the current known distribution of the 8220 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. The reported range of 198 occupied 10x10 km grid cells is 17 cells higher than that reported in NPWS (2019). This does not represent a genuine increase in the range of the habitat but is a result of improved knowledge of the distribution of the habitat. Additional grid cells have been added to the range in South Donegal, in the Slieve Aughty Mountains in East Clare and Southeast Galway, on Tully Mountain in West Galway and on the Mizen Head Peninsula in Cork. The additions to the distribution in the Slieve Aughty Mountains were from NSUH surveys (Barron et al., 2022b; Hodd et al., 2022a, 2022b), while the other additions were from observations by reliable, expert recorders. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). Although there are limited data on this habitat, there is no evidence of loss of habitat. Therefore, the short-term trend is assessed as *stable*. Similarly, the long-term trend is assessed as *stable*, as there is no evidence of loss, albeit based on limited data. Favourable Reference Range is equal to the current range. This is higher than that reported in the previous period, reflecting the increased knowledge of the range and distribution of 8220 in Ireland, rather than a genuine change. No loss of range has occurred since the Directive came into force and it is considered that the range when the Directive came into force is sufficient to include the full range of ecological variation of the habitat. The range is also regarded as large enough to ensure that the habitat survives in the long term.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1975-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***15.97 km²***
5.3 Type of estimate	*Best estimate / 95% confidence interval / **minimum***	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
b) Based mainly on extrapolation from a limited amount of data
<u>c) Based mainly on expert opinion with very limited data</u>
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2">There is no evidence of loss of area since the Directive came into force.</td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The surface area of the habitat was determined over a period beginning in 1975, when original survey work for the Habitat Assignment Project commenced, and incorporates updates made by surveys up until 2023. A full list of these resources is presented in section 3.4.

Area was calculated from the polygon shapefile and point shapefile used for distribution. All 8220 points located more than 20 m from 8220 polygons had an area of 2000 m² applied. This point area (m²) was used during previous reporting periods and carried over to the current reporting period to maintain consistency.

Surface area of the 8220 habitat has increased from 15.42 km² in NPWS (2019) to 15.97 km² this reporting period. Sources attributed to this increase comprise: National Survey of Upland Habitats (NSUH) surveys (Barron et al., 2022a, b; Hodd et al. 2022a, b), Hodd et al. (2023), Hodd (2023), Scott Cawley (2021) and R.L. Hodd (personal</td></tr>
</table>

	records). These additions represent previously unmapped 8220 habitat rather than genuine increases in 8220 surface area. More detailed survey work of the 8220 habitat is needed, and it is expected that the area listed in section 5.2 will be refined as more in-depth mapping of the 8220 habitat is completed. In particular, any area represented within the dataset by only a point needs to be surveyed in more detail. In addition to refining the areas of 8220 habitat currently known, there are probably still areas of unmapped 8220 habitat within the country. The area value entered is therefore a minimum. Area loss has not been determined through systematic review. Of the datasets used to map the 8220 distributions, loss of area was only fully assessed during the NSUH. Any conclusions regarding area loss are tentative and at a low level of confidence. Seventeen NSUH datasets were used in the Area assessment (Perrin *et al.* 2011, 2012, 2013a,b,d,e, 2014a,b; Roche *et al.* 2010a,b, 2011a,b, 2012a,b; Barron *et al.* 2022a; Hodd *et al.* 2022a,b). Sixteen of these NSUH sites are within SACs; therefore, losses within these sites are not fully representative of the losses occurring outside the Natura 2000 network where losses would be expected to be larger. These seventeen datasets represent 47.2% of the total area of the mapped 8220 habitat. The default trend periods are presented above and are used to calculate the magnitude of annual loss. Short-term trend direction for Area was determined to be *stable*. At the sample of sites covered by the NSUH, there were no recorded losses of 8220 habitat since 2013. Similarly, no gains in habitat were noted within this time period. Long-term trend direction for Area was determined to be *stable* overall. Since 2000, there were minor losses due to a landslide (which buried an area of habitat under loose sediment between 2000 and 2005) at one NSUH site, Comeragh Mountains SAC (001952). The overall nett loss of habitat area at this site was less than 1% per year (Roche *et al.,* 2010a). Scaled up to a national level, Area was assessed as *Favourable*, as the loss of habitat was so small that it did not impact on the Favourable Reference Area (FRA). Although the loss is not considered to be significant at a national scale, small losses in area at the site level may be important and conservation measures should be implemented to counteract these losses. FRA is deemed to be approximately equal to the current area. There is no information showing that an enlarged area is necessary for either typical species to reach *Favourable* conservation status or for the necessary structure and functions to exist, therefore the surface area of the habitat when the Directive came into force in 1994 is taken to be the FRA. While this figure is unknown, it is deemed to be approximately equal to the current area as there is no evidence of significant declines since this time.

<table>
<tr><th colspan="4">6 Structure and functions</th></tr>
<tr><td rowspan="6">6.1 Condition of habitat</td><td rowspan="2">a) Area in good condition</td><td>Minimum</td><td>13.74 km²</td></tr>
<tr><td>Maximum</td><td>15.97 km²</td></tr>
<tr><td rowspan="2">b) Area in not-good condition</td><td>Minimum</td><td>0.00 km²</td></tr>
<tr><td>Maximum</td><td>2.24 km²</td></tr>
<tr><td rowspan="2">c) Area where condition is not known</td><td>Minimum</td><td>0 km²</td></tr>
<tr><td>Maximum</td><td>0 km²</td></tr>
<tr><td>6.2 Condition of habitat Method used</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>6.3 Short-term trend of habitat area in good condition Period</td><td colspan="3">2013-2024</td></tr>
<tr><td>6.4 Short-term trend of habitat area in good condition Direction</td><td colspan="3"><u>stable</u> / increasing / decreasing / uncertain/ unknown</td></tr>
<tr><td>6.5 Short-term trend of habitat area in good condition Method used</td><td colspan="3">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>6.6 Typical species</td><td colspan="3">Has the list of typical species changed in comparison to the previous reporting period? YES/<u>NO</u></td></tr>
<tr><td>6.7 Typical species Method used
Optional</td><td colspan="3">Typical indicator species for 8220 habitat are: Asplenium adiantum-nigrum, Athyrium filix-femina, Blechnum spicant, Dryopteris spp. (count separately), Hymenophyllum tunbridgense, Hymenophyllum wilsonii, Saxifraga spathularis and Rhodiola rosea.</td></tr>
<tr><td>6.8 Additional information
Optional</td><td colspan="3">Structure and functions were assessed at a monitoring stop level by the NSUH (Perrin et al., 2014c), using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure. Criteria were adapted from the UK's Common Standards Monitoring (JNCC, 2009) using expert judgement.

The NSUH primarily assesses SACs and is currently incomplete. During the current reporting period, the focus of NSUH surveys has been on peatland sites, with only three 8220 monitoring stops recorded. All stops passed the assessment on all criteria (Barron et al., 2022a; Hodd et al., 2022a,b) and the Structure and functions of the habitat were assessed as Favourable at these sites.

As these assessments cover only 1.1 ha of 8220 habitat, which is 0.1% of the national area, these assessments cannot be taken to be</td></tr>
</table>

	indicative of the Structure and functions of 8220 nationally. Therefore, it is necessary to include assessments from the previous two reporting periods to give a more accurate overview of the national Structure and functions. There is no evidence that the condition of 8220 habitat at any of the sites surveyed by the NSUH since 2009 has significantly improved or declined, so the assessment results from those surveys should still be representative. If assessments from the current and previous reporting period, since 2013, are taken into account, there are a total of 12 assessments to consider. All 12 (100%) stops were assessed as *Favourable*. Scaled up to the national area of habitat, this equates to 15.97 km² of 8220 habitat in good condition and 0.00 km² in not-good condition. These figures were taken as the maximum area in good condition and minimum area in not-good condition, respectively. Following analysis of 43 NSUH 8220 monitoring stops, NPWS (2013b) assessed 86.0% of stops as being in good condition and 14.0% in not-good condition. Scaled up to the national area of habitat, this equates to 13.74 km² of 8220 habitat in good condition and 2.24 km² in not-good condition. These figures were taken as the minimum area in good condition and maximum area in not-good condition, respectively. The most frequent criterion that resulted in the failure of a Structure and functions assessment within 8220 habitat were 'proportion of vegetation composed of non-native species' (11.6%) and 'number of positive indicator species present' (7.0%) (NPWS, 2013b). Similar to the NPWS (2019), the short-term trend of habitat area in good condition is assessed as *stable* based on expert opinion.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA09 Burning for agriculture	Ongoing and likely to be in the future	Minority <50%	Low
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Low
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Low

PJ01 Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PJ03 Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Whole >90%	Low
PK03 Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	Minority <50%	Low
PM07 Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	R05653 *Epilobium brunnescens* R02685 *Campylopus introflexus* R02717 *Capra hircus* R03227 *Cervus nippon* R12976 *Rhododendron ponticum*
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Barron, S.J., Hodd, R.L. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 17: Ballyhoura Mountains SAC (002036), Cos. Limerick and Cork. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. CMP (2025) NPWS Conservation Measures Programme 2022-2024. Unpublished data, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. GSI (2024) IE GSI Landslide Extents 5K IE32 ITM. Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence. Accessed from: https://ga.geohive.ie/datasets/6d40adadb5454f4c842ca01ec39f5a8c_1/explore. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022a) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 19: Glendree Bog SAC (001912), Co. Clare. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Hodd, R.L., Barron, S.J. & Daly, O.H. (2022b) National Survey of Upland Habitats (Phase 5, 2020), Site Report No. 20: Loughatorick South Bog SAC (000308), Cos. Clare and Galway. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland. Joint Research Centre (JRC) European Forest Fire Information System (EFFIS) data request for Modis Burnt Areas. © European Union,

	1995-2021. Accessed from: https://forest-fire.emergency.copernicus.eu/applications/data-and-services. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.
7.4 Additional information *Optional*	Two of the NSUH sites assessed this reporting period had no impacts recorded within 8220 habitat (Hodd *et al.*, 2022a,b). The remaining NSUH site had three impacts recorded within the habitat (Barron *et al.,* 2022a). As there was limited information on pressures and threats to 8220 habitat originating from the current reporting period, information on pressures and threats were sourced from the assessments completed in previous reporting periods (NPWS, 2019; NPWS, 2013b) and the references contained therein. PI02 'Other invasive alien species (other than species of Union concern)' was retained as a medium influence pressure this reporting period. During the current reporting period, self-seeding conifers were impacting 8220 habitat at the NSUH site, Ballyhoura Mountains SAC (002036) (Barron *et al.,* 2022a). The invasive forb *Epilobium brunnescens* was the main reason for monitoring stops failing the Structure and functions assessment during the 2007-2012 reporting period (NPWS, 2013b). There are no new data to suggest that this pressure has been addressed. Other invasive species recorded in 8220 habitat by the NSUH include: *Campylopus introflexus, Cotoneaster* spp*.,* feral goat and non-native deer. There are also records of *Rhododendron ponticum* within the habitat (CMP, 2025; R.L. Hodd, pers. comm.). PA07 'Intensive grazing or overgrazing by livestock' was retained as a low influence pressure this reporting period. Overgrazing leads to erosion, nitrogen enrichment and damage to the vegetation across all upland areas. The impact of overgrazing on 8220 habitat may be less intensive than many upland habitats, as much of the area supporting 8220 habitat is out of reach of livestock on steep and unstable slopes. However, many parts of even the steepest rocky slope are accessible to grazing sheep, particularly close to the bottom of the slopes, and alongside ledges and gullies. Therefore, overgrazing is having a relatively high-intensity effect where it is impacting 8220 habitat, but the majority of the habitat is subject to little or no impact. A review of NSUH sites highlight that sheep grazing was primarily recorded as a neutral impact of 8220 habitat, however, there were instances where it was having a negative impact, e.g. Carlingford Mountain SAC (000453). On a national scale, an influence of low is deemed appropriate. If grazing intensity were decreased where this habitat is being heavily impacted by grazing, it is likely that the habitat would undergo a small expansion of area on a local scale. Undergrazing is not considered an impact on this habitat, as it does not require any grazing for its maintenance in good condition.

	PF05 'Sports, tourism and leisure activities' was retained as a low-influence pressure this reporting period. During the current reporting period, hill walking was having a low-intensity, negative influence on 8220 habitat at the NSUH site, Ballyhoura Mountains SAC (002036) (Barron *et al.,* 2022a). Rock climbing is undoubtedly having a negative impact on this habitat, which would be locally at high intensity in places that are popular with climbers. However, this impact is limited in extent, so an overall assessment of low influence is considered appropriate. PA09 'Burning for agriculture' was retained as a low-influence pressure this reporting period. The code PH04 'Vandalism or arson (incl. human-introduced wild fire)' was added as a low-influence pressure this reporting period. Although burning is a marginal threat to most stands of this habitat, there is a possibility of fire spreading from adjacent habitats and damaging this habitat. To investigate the impact of burning during the current reporting period, an EFFIS burnt area shapefile for the Republic of Ireland based on MODIS imagery was sourced covering the dates 01/01/2019 to 18/10/2024. This shapefile mapped 308 large fire events in the Republic of Ireland covering 18,590 ha. Intersect analysis between the burnt area shapefile and the 8220 habitat (i.e. the polygon and point distribution shapefiles) highlighted several overlaps between these GIS layers. This suggests that 8220 habitat was subject to (or simply located within the vicinity of) a large burn event this reporting period. PM07 'Natural processes without direct or indirect influence from human activities or climate change' was retained as a low-influence pressure this reporting period. Erosion impacts were recorded once during the previous reporting period (NPWS, 2019). Landslides caused area loss of 8220 habitat at one NSUH site, Comeragh Mountains SAC (001952) (Roche *et al.,* 2010a). To further investigate the impact of landslides, intersect analysis between a landslide shapefile (GSI, 2024) and the 8220 habitat (i.e. polygon and point distribution shapefiles) was conducted. This analysis highlighted several overlaps between these GIS layers, including overlaps with landslides that occurred this reporting period. Considering that 8220 habitat often only occupies a small proportion of polygons within which it occurs, there is unlikely to be a genuine overlap in all instances (i.e. upgrading this impact to a higher influence was not warranted). Other low-influence pressures from the previous reporting periods that were retained as low influence this reporting period comprise: PK03 'Mixed source air pollution', PI03 'Problematic native species' (e.g. native deer grazing) and PJ 'Climate change'. Climate change has been projected to impact the rarer and more restricted characteristic species of this habitat in the future (Wyse Jackson, 2007; Hodd *et al.*, 2014), through rising temperatures and other factors (PJ01), but no evidence of this occurring has been searched for yet. It is also possible that climate change might lead to more frequent and widespread rockfalls, landslides and other erosion events, through increased frequency of intense rainfall events (PJ03). PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)' has not been recorded previously for the 8220 habitat; however, this

	impact has been recorded within the similar but rarer, 8210 calcareous rocky slopes habitat. Although there are limited data, it is highly likely 8220 habitat is impacted by PC01, especially outside of SACs, where there is less scrutiny. Therefore, this impact was added as a low-influence pressure.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): ***Maintain current state** / expand range / increase habitat area/ improve habitat condition*
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*

8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats) MI03 Management, control or eradication of other invasive alien species MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others)
8.7 Additional information *Optional*	Conservation measures are selected based on NPWS (2019), data from the NPWS Conservation Measures Unit (CMP, 2025), Department of Agriculture, Food and the Marine (DAFM) and expert opinion. The main measures that are likely influencing this habitat are MA03 'Maintain existing extensive agricultural practices and agricultural landscape features' and MA05 'Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)', with the extent of the impact of these measures on 8220 habitat unknown. A range of agri-environmental schemes are in operation in the Irish uplands, the majority of which are targeted at peatlands and would be unlikely to impact 8220 habitat. The primary scheme which may have some positive impacts is the Agri-Climate Rural Environment Scheme (ACRES), which is Ireland's new agri-environment climate scheme under Ireland's CAP Strategic Plan (2023-ongoing). As of 16 December 2024, the total number of participants in ACRES (General and Co-operation) is 54,312, covering 1.5 million ha. Upland and other high-priority geographical areas are included under ACRES Co-operation Project (ACRES CP), with eight CP zones nationwide. The ACRES CP core payments are based on a results-based scorecard and general actions (if applicable), with a maximum payment of €7,000 per year. Given the wide scope and geographical spread of ACRES, it is likely that there are some positive benefits for 8220 habitat, through regulation and reduction of sheep grazing. As these measures are not specifically targeted at the 8220 habitat, any effects of the measures are likely incidental. The NPWS Conservation Measures Programme 2022-2024 (CMP, 2025) Microsoft Excel spreadsheet was reviewed for measures associated with the 8220 habitat. Two measures are listed: MA06, in the form of replacement of fencing to prevent sheep from trespassing in part of The Twelve Bens/Garraun Complex SAC (002031), and MI04 Rhododendron control within Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342). The extent of 8220 habitat impacted by these measures was not provided.

	Further and/or more extensive targeted measures are required for this habitat. A reduction in grazing intensity, or exclusion of grazing livestock from alongside cliffs supporting 8220 habitat is likely to improve the quality of this habitat and increase its area on a local scale. Structure and functions of the habitat would be improved by implementing the measure MI03 in the form of developing a management strategy for the control of *Epilobium brunnescens*. However, in practice this may prove to be a time-consuming and ultimately unsuccessful task, due to the small size of *E. brunnescens* and ubiquity throughout a range of habitats, and with a high potential for recolonisation after removal. Additional research on this habitat, along with enhanced monitoring (e.g. nitrogen deposition impacts, climate impacts), is necessary to ensure effective conservation into the future.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Current Area is approximately equal to the Favourable Reference Area. Conservation status of Area is therefore *Favourable*. Future trend of Area is assessed as *stable*, as no change in area is expected. Future prospects of Area are therefore *Good*. Short-term trend direction is stable for habitat that is in good condition. Current Structure and functions are assessed as *Unfavourable* as < 90% of habitat is in good condition. Based on available data from the current and previous reporting periods, it is estimated that somewhere between 0% and 14.0% of 8220 habitat is in poor condition, equating to an *Unfavourable-Inadequate* assessment for Structure and functions. Future trend of Structure and functions is assessed as *negative*, as the threat of overgrazing (PA07) is expected to have an ongoing influence on the structure and functions, as any potential positive impacts of conservation measures are incidental and not guaranteed in the future due to the cyclical nature of agri-environmental schemes. The main driver of poor structure and functions, invasion of 8220 habitat by *Epilobium brunnescens* (PI02), is not currently being addressed and there is no plan in place to tackle this threat. There is only a small niche for plant species representative of 8220 habitat, so even if a small area within the 8220 habitat is taken up by an invasive species, the native indicator species are displaced. This pressure may become more significant when combined with the effects of climate change on the	

	8220 habitat. Future prospects of Structure and functions are therefore *Poor*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	The Conservation Status of Range is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of Area is *Favourable* in this reporting period, as it was in the previous reporting period. The Conservation Status of the Structure and functions and Future prospects are *Unfavourable-Inadequate* in this reporting period, as they were in the previous reporting period. The Overall assessment of Conservation Status was assessed as *Unfavourable-Inadequate*, as it was during the last reporting period. The status of *Unfavourable-Inadequate* during the current reporting period was due to <90% of the area of 8220 habitat assessed as having good (*Favourable*) Structure and functions. Trend in Overall assessment of Conservation Status was assessed as *stable* in this reporting period, as it was during the last reporting period.	

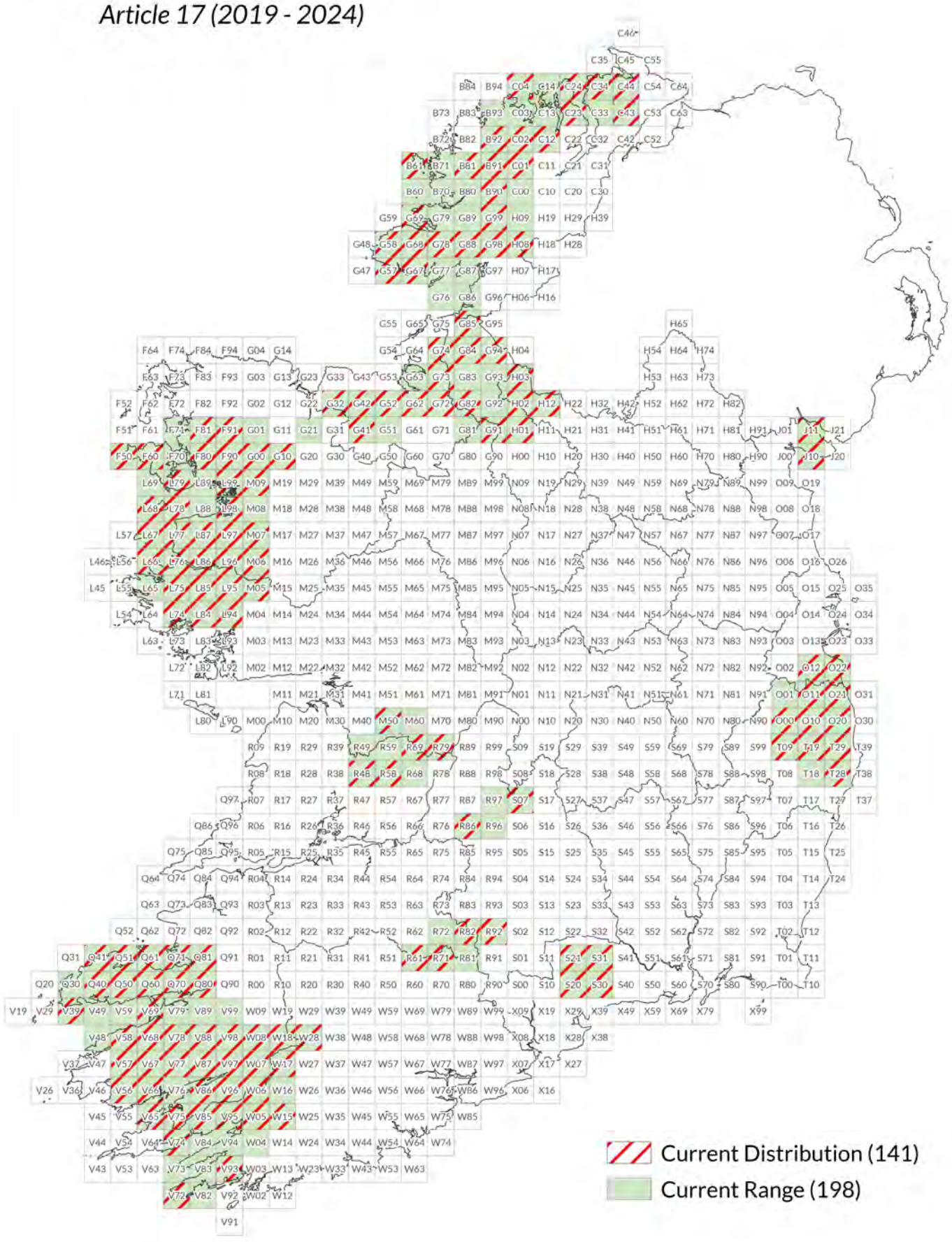
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***14.96 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Area within the SAC network and associated trend were estimated by performing a union between the distribution polygon shapefile and the SAC shapefile, and an intersect between the distribution point shapefile and SAC shapefile. The area given in section 11.1 is the total area of 8220 habitat in SACs in the country (93.7% of total area), including some SACs where 8220 is not listed as a qualifying interest (QI). It is likely that the area of 8220 habitat outside of SACs is underestimated, as most surveys that consider this habitat would have been undertaken within SACs.	

	Therefore, the true percentage of the total national area located within SACs is likely lower than that reported here. The area of 8220 habitat within the SAC network where it is listed as a QI is 11.41 km^2. No anthropogenic loss of 8220 habitat within SACs was reported in the current reporting period. The short-term trend of 8220 habitat in good condition within the SAC network is taken to be stable, following the national trend in section 6.4. The surface area of 8220 habitat within the SAC network has increased by 0.53 km^2 since the last reporting period. This is due to improved knowledge lending itself to a refinement of area totals (see section 5.17 for details).

12 Complementary information *N/A*

Siliceous rocky slopes (8220)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**8240 Limestone pavements***
1.2i Habitat short name	**Limestone pavement**
1.3i Habitat description	8240 Limestone pavement is a priority EU Annex I habitat. The structure of the 8240 Limestone pavement habitat typically consists of blocks of rock, known as clints, separated by fissures or grikes. Sometimes due to weathering this structure is less defined, especially in the 'shattered' variant of pavement. Limestone pavement can occur as areas of exposed rock with very little vegetation or in association with grassland, heath, scrub, or woodland communities. The main vascular plant species associated with the 8240 habitat include scattered low-growing woody species such as *Corylus avellana, Hedera helix, Ilex aquifolium, Rosa spinosissima* and *Rubus fruticosus,* and herbaceous species such as *Sesleria caerulea, Teucrium scorodonia, Mycelis muralis, Geranium robertianum, Senecio jacobaea, Carlina vulgaris* and *Carex flacca*. A suite of calcicole ferns are also usually found, including *Asplenium ruta-muraria, Asplenium ceterach* and, in the deeper grikes, the shade-loving *Asplenium scolopendrium*. Characteristic bryophytes are *Ctenidium molluscum, Tortella tortuosa* and *Neckera crispa*. The wooded variant of 8240 Limestone pavement has been recorded in areas of Hazel woodland with a low canopy of at least 3 m and minimal soil depth. Under canopy the surface of the limestone pavement is sometimes completely covered by bryophytes such as *Eurhynchium striatum, Neckera crispa* and *Thamnobryum alopecurum*. The 8240 habitat has been defined within Irish vegetation communities RH1A *Asplenium trichomanes-Ctenidium molluscum* crevice community, RH1B *Teucrium scorodonia-Mycelis muralis* pavement community, and the woodland community WL2E *Corylus avellana-Potentilla sterilis* (Perrin, 2018a-c).

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*

2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map was compiled from 8240 polygons digitised by NPWS (2007), Wilson & Valverde (2013), O'Neill *et al*. (2013), O'Neill & Martin (2015), Galway County Council (2017), Martin *et al*. (2018), O'Brien (2020), Parr & Jeuken (2021), Martin *et al*. (in prep.), the NPWS National Fen Survey 2021 to 2023 dataset and based on data provided by NPWS staff. Data sources that recorded the 8240 habitat were assigned a level of certainty; 3 = high certainty based on a field survey/ground-truthed, 2 = medium certainty usually based on brief field observations, 1 = low certainty often data that have not been validated in the field (e.g., based principally on remote imagery). All data sources with a certainty of 1 to 3 were used to map the distribution of the 8240 habitat. Following a review of the 8240 data collected during NPWS (2019) using a combination of remote imagery, new data sources that were compiled during the current reporting period, and information from NPWS staff, 11 areas of 8240 areas were remapped as non-Annex habitat due to anthropogenic losses. These areas were removed from the current distribution and range, but were utilised when calculating the Favourable Reference Range together with the 267 areas of 8240 lost during the last round of reporting (NPWS, 2019). In should be noted that a much more comprehensive review of the 8240 habitat loss was undertaken by NPWS (2019) and this resulted in many more areas of 8240 loss being recorded.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	CMP (2025) NPWS Conservation Measures Programme (CMP) 2022-2024. Unpublished data, National Parks and Wildlife Service. Department of Housing, Local Government and Heritage, Dublin. EPA (2017) A Summary of the State of Knowledge on Climate Change Impacts for Ireland: Report 11 (2010-2016). Prepared for the Environmental Protection Agency by MaREI Centre, Environmental Research Institute, University College Cork. M. Desmond, P. O'Brien and F. McGovern. EPA, Wexford. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland

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Parr, S. & Jeuken, N. (2021) Linking Burren Data Project. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.

Perrin (2018a) Irish Vegetation Classification: Community synopsis RH1A *Asplenium trichomanes - Ctenidium molluscum* crevice community. http://www.biodiversityireland.ie/wordpress/wp-content/uploads/RH1A.pdf. Accessed February 2018.

Perrin (2018b) Irish Vegetation Classification: Community synopsis RH1B *Teucrium scorodonia - Mycelis muralis* pavement community. http://www.biodiversityireland.ie/wordpress/wp-content/uploads/RH1B.pdf. Accessed February 2018.

Perrin (2018c) Irish Vegetation Classification: Community synopsis WL2E *Corylus avellana - Potentilla sterilis* woodland. http://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL2E.pdf. Accessed February 2018.

Wilson, S. & Valverde, F. (2013) National Survey of Limestone Pavement and Associated Habitats in Ireland. *Irish Wildlife*

	Manuals, No. 73. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***9,600 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (4.5 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 – 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 9,600 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Reference-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information	The Favourable Reference Range (FRR) established by NPWS (2013) and used again in NPWS (2019) has been increased from 9,000 km² to	

Optional	9,600 km². This increase in range is due to the 8240 habitat being recorded in four new 10x10 km grid cells during the current reporting period. The new grid cells are G80 (Carrickmore Co. Roscommon) and M84 (Killeglan Co. Roscommon) recorded by Martin *et al*. (in prep.) and R25 (Barrigone Co. Limerick) and R47 (Quinn Co. Clare) recorded by NPWS staff (pers. comm.). There is no evidence of loss of range since the Directive came into force and the geographic spread is considered sufficient for the long-term survival of the habitat. Range was calculated using the range tool, based on the current known distribution of the 8240 habitat. A maximum gap distance of two 10x10 km grid cells was used when running the range tool. This methodology resulted in the four additional 10x10 km grid cells in the distribution adding six additional grid cells to the range. Short-term trend was estimated based on data from the current reporting period and the previous reporting period (NPWS, 2019). None of the area losses recorded during these two reporting periods led to a contraction in the range. Trend in Range was assessed as *stable* over the period as the additional four grid cells reported during the current reporting period would have been present in 2013 and 2019. The FRR was calculated using the range tool, based on the current known distribution of the 8240 habitat and the recorded losses since NPWS (2013). Due to the increase in the current range, the FRR has also increased, to 9,600 km².

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2004-2024***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***312.17 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	***0.05%***
	b) Estimated Maximum	***0.05%***
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval /* ***minimum****/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ <u>between 2% and 10% smaller than the FRA</u>
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ <u>Reference-based approach</u></td><td>Indicate the quality of information available:
high/<u>moderate</u>/low</td></tr>
<tr><td colspan="2">☐ Expert opinion</td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The period over which the surface area of the habitat was determined begins in 2004 and incorporates updates made during the last two reporting period (NPWS, 2019; NPWS, 2013) and data collected during the current reporting period: O’Brien (2020), Parr & Jeuken (2021), Martin et al. (in prep.), the NPWS National Fen Survey 2021 to 2023 dataset, and areas of 8240 habitat reported by NPWS staff. There are probably still small areas of unmapped 8240 habitat within the country.

Favourable Reference Area (FRA) was not determined exactly. However, it is deemed to be greater than, but <10% greater than, the current area, given that anthropogenic losses have occurred since the Directive came into force. During the last two reporting periods, 2.78 km² of 8240 habitat has been reported as lost; 2.45 km² of this loss was reported in NPWS (2019) when a more extensive review process was undertaken, which means the current FRA is 314.95 km².</td></tr>
</table>

	The 8240 habitat mapped during the previous reporting period was reviewed for this report using survey information collected during the current reporting period (listed above). This review added areas of 8240 to the distribution (see section 4.14 above) and also recorded 32.52 ha of habitat loss, which represents a loss of 0.1% of the total area. The conversion of limestone pavement into agricultural land accounted for all losses of 8240 habitat during the current reporting period. Short-term trend in Area was deemed to be *decreasing* because the national area of 8240 had been reduced by 32.52 ha due to anthropogenic factors. All losses during the current reporting period were recorded in the last two years, resulting in a 0.05% loss per annum. It is expected that this reported loss is an underestimate as a national survey of the 8240 habitat was not undertaken during the current reporting period.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***248.80 km²***
		Maximum	***248.80 km²***
	b) Area in not-good condition	**Minimum**	***63.37 km²***
		Maximum	***63.37 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / **increasing** / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***		

6.7 Typical species Method used *Optional*	
6.8 Additional information *Optional*	During the current monitoring period no new data were available on the structure and functions of the 8240 habitat. In NPWS (2019) the area of 8240 habitat in good condition was estimated based on three sites, with the main site a 74.50 ha area of 8240 habitat associated with Lough Corrib SAC (site code 000297) where 83 monitoring stops were recorded (Galway County Council, 2017). Data were also collected from two smaller sites (<10 ha each) in Clare and Galway (O'Neill & Martin, 2017). Overall, 79.7% of the surveyed 8240 area was assigned as having *Favourable* Structure and functions. As the three sites only represented 0.3% (88.46 ha) of the national area of 8240 at the time the subsample is small. For the 2008-2013 monitoring period, the area of 8240 habitat in good condition can be calculated based on the 25 National Survey of Limestone Pavement (NSLP) sites presented in Wilson & Valverde (2013). Although NPWS (2013) used a larger dataset to assess Structure and functions, the 25 NSLP sites are the only ones where it is possible to match structure and functions data to specific areas of 8240. The 25 sites are more representative than the NPWS (2019) data as they cover 19.2% (6,176.24 ha) of the area of 8240 reported in NPWS (2013). Overall, 78.5% of the surveyed 8240 area was assigned as having *Favourable* Structure and functions, which is very similar to the NPWS (2019) figure. Therefore, in the absence of any new data the 79.7% reported in NPWS (2019) is reported again for the current reporting period as it is considered to be broadly representative of the percentage of 8240 habitat in *Favourable* condition. The main reasons that 8240 limestone pavement failed the Structure and functions assessment (NPWS 2019; NPWS 2013) are high cover of scrub, the presence of non-native species, and negative indicator species, such as *Rubus fruticosus* agg, that are spreading due to land abandonment. It should be noted that these unfavourable conditions were recorded in areas of 8240 associated with exposed rock or grassland and heath communities, rather than where the 8240 habitat is associated with scrub, or woodland communities. The Burren Programme reported in NPWS (2019) that the conservation measures they have applied have improved the Structure and functions of Annex I habitats, including limestone pavement, within the areas covered by the scheme (Sharon Parr, pers. comm.). The work of the Burren Programme is being continued with 80% of the Burren National Park currently grazed under grazing agreements drawn up for the management of Annex I habitats, such as 8240, within the ACRES scheme. In addition, during the current reporting period NPWS have cleared approximately 130 ha of problematic scrub from the 8240 habitat, primarily within the East Burren Complex SAC (Site code 001926) and an unrecorded area of invasive non-native species such as Sycamore (*Acer pseudoplatanus*) have been cleared from the 8240 habitat within the Coole-Garryland SAC (Site code 000252). Although, only a small percentage (<0.5%) of the national 8240 area has been positively influenced by these new

	conservation measures, with scrub and invasive species being significant pressures on the structure and functions of the 8240 habitat, this represents a small *increasing* trend as reported in section 6.4.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PA01 Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Minority <50%	High
PA08 Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Medium
PC01 Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Minority <50%	Medium
PF01 Conversion from other land uses to built-up areas	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Minority <50%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	Japanese knotweed (R18201 *Reynoutria japonica*), Sycamore (R00120 *Acer pseudoplatanus*), Snowberry (R14754 *Symphoricarpos albus*), and Winter heliotrope (R19025 *Petasites pyrenaicus*). No other invasive alien species recorded during the current recording period, but based on expert opinion invasive *Cotoneaster* species (R04205 *Cotoneaster horizontalis*, R04215 *Cotoneaster integrifolius*, R04224 *Cotoneaster microphyllus*) are known to occur within the 8240 habitat.
7.2 Methods used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	Pressures recorded by O'Neill & Martin (2017), Galway County Council (2017), and the 8240 habitat area reviews undertaken during the current reporting period and by NPWS (2019) were utilised. In addition, pressures recorded by NPWS staff during the current reporting period were also included.

7.4 Additional information *Optional*	Pressures and threats were selected and ranked based on intensity (high, medium or low), frequency of occurrence, and area of impact, using the data gathered by O'Neill & Martin (2017), Galway County Council (2017) and the 8240 area reviews undertaken in NPWS (2019) and during the current reporting period. The pressure that contributed to the largest areas of 8240 habitat loss during the current reporting period is PA01 'Conversion into agricultural land (excluding drainage and burning)'. PA01 is listed as a high importance pressure due to its significant impact on the 8240 habitat. PC01 'Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)' accounted for a significant area of 8240 habitat loss during the previous reporting period and is listed as a medium importance pressure as it was in NPWS (2019). Based on expert opinion PA08 'Extensive grazing or undergrazing by livestock', PF01 'Conversion from other land uses to built-up areas', PI02 'Other invasive alien species (other than species of Union concern)' and PI03 'Problematic native species' are all assessed to be medium importance pressures. PA08 and PF01 were not recorded during the current reporting period. PI02 was recorded at one site, Coole-Garryland SAC, with the three invasive non-native plants species Sycamore (*Acer pseudoplatanus*), Snowberry (*Symphoricarpos albus*), and Winter Heliotrope (*Petasites pyrenaicus*) recorded at the site. PI03 was recorded at two 8240 sites by NPWS staff. PA08 has been listed as an important pressure due to the fact that undergrazing leads to succession to scrub and woodland and a reduction in the area of more open 8240 Limestone pavement habitats. This results in a reduction in the ecological niches the habitat can provide and an overall reduction in the Structure and functions. Although not recorded during the current reporting period, based on expert opinion *Cotoneaster* species are occasional alien invasive species (PI02) recorded within the 8240 habitat. Problematic native species (PI03), such as *Pteridium aquilinum*, were recorded as a medium importance pressure during the previous reporting period (NPWS, 2019). *Pteridium* was recorded as a pressure at one 8240 site during the current reporting and fast growing native woody species, such as *Prunus spinosa*, were also recorded as a problematic native species at one site during the current reporting period. Japanese knotweed (PI02) was recorded by NPWS staff at one site during the current reporting period. Additionally, pollution pressures (PK03 and PK04) were noted at one site. Information on pressures was limited due to the lack of a comprehensive survey of the 8240 habitat during the current reporting period.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken* *If no, a justification must be provided in free text field 8.7*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* ***a) Maintain the current range, surface area or structure and functions of the habitat type*** *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* ***a) Short-term response (within the current reporting period, 2019 - 2024)*** *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MA03 Maintain existing extensive agricultural practices and agricultural landscape features MI04 Restoration of habitats affected by invasive alien species (incl. of Union concern and others) MI05 Management of problematic native species MM01 Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change
8.7 Additional information *Optional*	Based on expert opinion the most common conservation measure implemented within the 8240 habitat is appropriate grazing with stock (conservation measure MA03), with schemes such as the NPWS Farm Plan Scheme and the Department of Agriculture's ACRES agri-environment scheme promoting this measure. In the Burren National Park 80% of the area is grazed under grazing agreements drawn up for the management of Annex I habitats such as 8240 within the ACRES scheme. With 16.1 km² of 8240 in the Burren National Park, this represents 12.9 km² (4.1 % of the total 8240 area reported in section 5.2) managed under measure MA03. In addition, other common negative pressures on the 8240 habitat, such as problematic native species (PI03) and invasive species (PI02), can be addressed by schemes such as the NPWS Farm Plan Scheme, EU LIFE projects (e.g., Carra LIFE), and the Department of Agriculture's ACRES agri-environment scheme. Caomhnú Árann EIP (2019-2023) has undertaken measures to help support limestone pavement and associated habitats through grazing (MA03), clearing 93.4 ha of problematic scrub (MI05), and added the installation of rain harvesting tanks, 253 new and 13 repaired, across the islands. Lack of water supply is one of the main reasons leading to land abandonment on the islands. Supplying rainwater harvesting tanks ensures that fields can be grazed during the winter and the conservation of limestone pavements and associated habitats can be maintained. Similarly, the Burren Programme (2016-2022) has undertaken conservation measures such as grazing (MA03), cleared 145 ha of problematic scrub and 10 ha of Bracken (MI05). In addition, the Burren Programme has also included water provision actions such as installing water harvesting (22), piping (470 rolls), pumps (26), drinking troughs (348), and storage tanks (51). For fields that had been continuously in the Burren Farming for Conservation Programme (2010-2015) and the Burren Programme (2016-2022; 574 fields equating to 4,567 ha) the average assessment score went from 6.8 (2010) to over 7.6 (2020), thus highlighting the positive impact that results-based projects can have on 8240 habitat. During the current reporting period, NPWS staff reported that the conservation measure of Bracken control (MI05) was currently being implemented through ACRES at a west Cavan site. The NPWS have also cleared approximately 130 ha of problematic scrub from the 8240 habitat, primarily within the East Burren Complex SAC, this measure being recorded under MM01 (CMU, 2025). In addition, an unrecorded area of invasive non-native species such as Sycamore (*Acer pseudoplatanus*), Snowberry (*Symphoricarpos albus*) and Winter Heliotrope (*Petasites pyrenaicus*) have been cleared from the 8240

	habitat within the Coole-Garryland SAC; this measure has been recorded under MI04 (CMU, 2025). With 20.3% of the 8240 area not being in good condition, there is a need for conservation measures to be applied across a significant area of the habitat. The current evidence suggests that only a small proportion (< 5%) of the 8240 habitat area is being positively impacted by conservation measures, but information on measures was under-recorded due to the lack of a comprehensive survey of the 8240 habitat during the current reporting period.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good /* ***Poor*** */ Bad / Unknown*
	c) Structure and functions	*Good /* ***Poor*** */ Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to the Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as the range is expected to stay the same based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *decreasing*. Current area is <10% smaller than the Favourable Reference Area. Conservation status of Area is therefore *Unfavourable-Inadequate* with the magnitude of the known loss -0.05% per annum. Future trend of Area is assessed as *negative*, as the area is expected to decrease based on the balancing of the threats and conservation measures that are currently in place. Future prospects of Area are therefore *Poor*. Current Structure and functions are assessed as *Unfavourable-Inadequate* as >75% but <90% of the habitat is in good condition. Short-term trend direction is *increasing* (for habitat that is in good condition). Conservation status of Structure and functions is therefore *Unfavourable-Inadequate*. Future prospects of Structure and functions are therefore *Poor*.	

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.4 Future prospects	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) /* ***Inadequate (U1)*** */ Bad (U2) / Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*

Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
a) No, there is no difference	***a) No, there is no difference***
b) yes, due to genuine change	*b) yes, due to genuine change*
c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
d) yes, due to the use of different method	*d) yes, due to the use of different method*
e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
f) yes, due to other reasons	*f) yes, due to other reasons*

10.8 Additional information

Optional

The Overall Conservation Status is assessed as *Unfavourable-Inadequate*, as it was during the last two reporting periods. The status of *Unfavourable-Inadequate* during the current reporting period is due to a loss in area of -0.05% per annum and the fact that 79.7% of the 8240 area had structure and functions in good condition.

Overall trend in Conservation Status was assessed as *stable* during the current reporting period. This is due to the fact that, although areas of 8240 habitat have been lost during the current reporting period, the rate of loss is relatively low at -0.05% per annum, and is counteracted by the *increasing* trend in Structure and functions. During the previous reporting period (NPWS, 2019) the overall trend had also been assessed as *stable*, as the *decreasing* trend in Area was also counteracted by an *increasing* trend in Structure and functions.

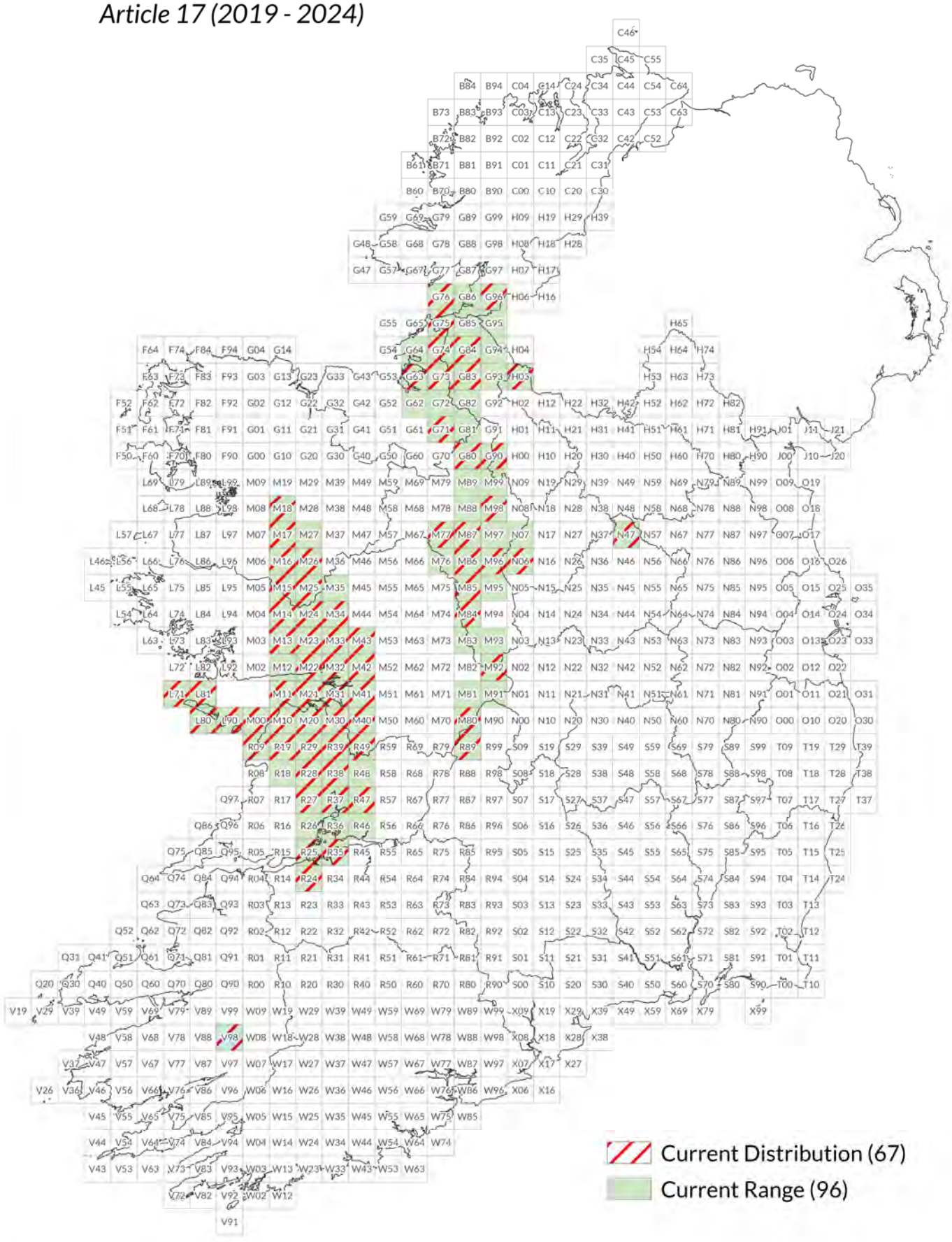
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***258.28 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* ***b) increasing*** *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	The area within the network was estimated by performing an intersect between the 8240 distribution shapefile and the SAC shapefile. The area given in section 11.1 is the total area of the 8240 habitat in SACs in the country, including some SACs where the habitat is not listed as a qualifying interest (QI). The area of 8240 within the SAC network where it is listed as a QI is 254.70 km^2. During the current reporting period, 10.5% (3.42 ha) of the 32.52 ha of 8240 habitat loss was from SACs and all of this area loss was from	

	one SAC, Barrigone (site code 000432) where the 8240 habitat is a QI. For the last reporting period, NPWS (2019) reported a very similar percentage loss from SACs, with 10% of the 2.45 km^2 of 8240 habitat reported lost from within SACs and, of this loss, all except 73.19 m^2 was from twelve SACs where the 8240 habitat is listed as a QI (NPWS 2019). The short-term trend of the habitat area within the SAC network is taken to be *decreasing*, with the same trend as the 8240 habitat nationally. The short-term trend of the habitat area in good condition within the SAC network is taken to be *increasing*, with the same trend as the 8240 habitat nationally.

12 Complementary information *N/A*

Limestone pavement* (8240)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

N

V1.0 2025
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(CYAL50446484)

NATIONAL LEVEL	
1 General information	
1.1 Member State	***IE***
1.2 Habitat code / name	**8310 Caves not open to the public**
1.2i Habitat short name	**Caves**
1.3i Habitat description	There is little evidence that Irish caves support much in the way of specialised or endemic fauna. However, the Lesser Horseshoe Bat (*Rhinolophus hipposideros*), which is listed on Annex II of the Habitats Directive, occurs in caves in Ireland. Consequently, in practice, this EU habitat is confined in Ireland to caves which are not used for tourism and host important numbers of Lesser Horseshoe Bats. The Lesser Horseshoe Bat is mainly restricted to six western counties: Mayo, Galway, Clare, Limerick, Kerry and Cork. It requires cool, stable temperatures and minimal disturbance for winter hibernation and suitable caves are selected where available. Lesser horseshoe bats may also turn up in caves at other times of year, although not in significant numbers.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2012-2024***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The Geological Survey of Ireland (GSI) database of all the known caves in Ireland was used for this assessment. NPWS have a database of all known Lesser Horseshoe Bat roosts in Ireland. The range of this habitat has been estimated by overlaying the GSI's cave dataset with the Lesser Horseshoe Bat data from 2012-2024. The Lesser Horseshoe Bat has been well surveyed over the last 30 years (e.g. Kelleher, 2004; McAney, 2016; Aughney *et al*., 2022) and NPWS holds a comprehensive and up-to-date dataset of roost locations. The GSI dataset is considered to be comprehensive. Monitoring of the Lesser Horseshoe Bat at cave sites is carried out by staff of NPWS and the quality of the data is excellent. That said, not all caves are surveyed

	and new roosts are occasionally found; there are likely to be additional cave sites used by these bats that we are not aware of.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic***, *Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Aughney, T. *et al*. (2022) Irish Bat Monitoring Programme 2018-2021. *Irish Wildlife Manuals*, No. 137. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. https://www.npws.ie/sites/default/files/publications /pdf/IWM137.pdf. Dool S.E., Puechmaille, S.J., Kelleher, C., McAney, K. & Teeling, E. (2016) The effects of human-mediated habitat fragmentation on a sedentary woodland-associated species (*Rhinolophus hipposideros*) at its range margin. *Acta Chiropterologica*, 18(2), 377–393. Kelleher, C. (2004) Thirty years, six counties, one species - an update on the Lesser Horseshoe Bat *Rhinolophus hipposideros* (Bechstein) in Ireland. *Irish Naturalists' Journal,* 27, 387-392. McAney, K. (2016) Lesser horseshoe bat (*Rhinolophus hipposideros*) Pp 71-72. In Lysaght, L. and Marnell, F. (eds) (2016) *Atlas of Mammals in Ireland 2010-2015*, National Biodiversity Data Centre, Waterford. NPWS (2025) Lesser horseshoe bat database. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. NPWS & VWT (2022) *Lesser Horseshoe Bat Species Action Plan 2022-2026.* National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. https://www.npws.ie/publications/species-action-plans. Roche, N. (2024) Lesser horseshoe bat population estimate 2024. Unpublished report to the National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland. https://www.npws.ie/publications. Roche, N., Langton, S. & Aughney, T. (2012) Lesser Horseshoe Bat: Population, Trends and Threats 1986 to 2012. Unpublished report from Bat Conservation Ireland to the National Parks and Wildlife Service, Dublin, Ireland. Roche, N., Aughney, T. & Langton, S. (2015) Lesser Horseshoe Bat: population trends and status of its roosting resource. *Irish Wildlife*

	Manuals, No. 85. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Roche, N., Aughney, T., Marnell, F. & Lundy, M. (2014) *Irish bats in the 21st Century*. Bat Conservation Ireland, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan, Ireland. Mitchell-Jones, A.J., Bihari, Z., Masing, M. & Rodrigues, L. (2007) Protecting and managing underground sites for bats. EUROBATS Publications Series No. 2. UNEP/EUROBATS, Bonn, Germany. Mullan, G. (ed.) (2007) *The Caves of County Clare and South Galway*. University of Bristol Speleological Society.

4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***8,300 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	*stable /* ***increasing*** */ decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***
4.6 Short-term trend Magnitude Type of estimate *Optional*	***Best estimate*** */ multi-year mean / 95% confidence interval / minimum/pre-defined range*	

4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*		
4.9 Long-term trend Direction *Optional*		
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*		
4.12 Favourable reference range	***a) 5,200 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*		
4.14 Additional information *Optional*	The GSI database of all the known caves in Ireland was used for this assessment. NPWS have a database of all known Lesser Horseshoe Bat roosts in Ireland. The range of this habitat has been estimated by overlaying the cave dataset with the Lesser Horseshoe Bat data from 2012-2024.	

	A total of 52 10x10 km grid cells are included in the resulting distribution (5,200 km^2). Using the range tool, with gap closure set to 20 km, an additional 31 grid cells were incorporated giving a total range of 83 10x10 km grid cells (8,300 km^2). The increase in the range of the Lesser Horseshoe Bat since 2019 explains some of the increase in the range of this habitat, and additionally more intensive surveys for bats have uncovered previously unknown underground sites. The cave dataset used this time is also considered more comprehensive than the Drew dataset used in 2019. The current range is larger than the known range in 2019. The short-term trend is increasing and, overall, availability of better data is the main explanation for the increase. The new distribution figure (5,200 km^2), which is based on more up-to-date and accurate information, is taken as the new Favourable Reference Range.

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2012-2024***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0088 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	

5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / **increasing** / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	***Short-term trend magnitude is unknown***
5.9 Short-term trend Magnitude Type of estimate	***Best estimate** / multi-year mean / 95% confidence interval / minimum/pre-defined range*	
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*		
5.12 Long-term trend Direction *Optional*		
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*		
5.15 Favourable reference area	***a) 0.0088 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	

	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	There are 88 caves included as roosts in the national Lesser Horseshoe Bat database (2025). The measurement of the actual surface area parameter, however, is problematic. While extensive mapping surveys of some cave systems have been done and the length and area may be known (e.g. Mullan, 2007), a complete national survey has not been undertaken. Furthermore, only parts of any cave will be of value to bats and this in turn may vary from year to year. In the absence of more detailed information, which would require extensive field survey, the same approach as used in the 2019 assessment is used again here, with each of the 88 caves used by Lesser Horseshoe Bats given a nominal area of 100 m^2. Although some inter-annual population fluctuations of bats may occur in caves, e.g. as seen in certain karst caves following winter flooding events, there is no evidence of caves being lost to the species altogether. The expansion in range of the Lesser Horseshoe Bat accounts to some extent for the increase in surface area reported for this habitat. However, the main explanatory factor is better data both in terms of a more comprehensive cave dataset (from the GSI) and more complete data on bat roost usage. Overall, the trend is taken as *increasing* but the magnitude is not known. The current area is taken as the Favourable Reference Area.	

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.0088 km²***
		Maximum	***0.0088 km²***
	b) Area in not-good condition	**Minimum**	***0 km²***
		Maximum	***0 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***

6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	Lesser Horseshoe Bat (Rhinolophus hipposideros) is the only typical species for this habitat in Ireland.
6.8 Additional information *Optional*	There is little evidence that Irish caves support much in the way of specialised or endemic fauna. However, the Lesser Horseshoe Bat (*Rhinolophus hipposideros*), which is listed on Annex II of the Habitats Directive, occurs in caves in Ireland. Consequently, this bat is considered to be the only typical species for this habitat in Ireland. The assessment of *Favourable* condition relates therefore to the suitability of the cave habitat for this bat. Lesser Horseshoe Bats use caves in Ireland almost exclusively for hibernation and their requirements are for cool, stable temperatures and minimal disturbance for the winter period. Caves which are open to tourism are not included in this habitat type. Nonetheless, some caves included here are subject to human disturbance as a result of *ad hoc* caving or related recreational activities. In particularly sensitive locations, grilles have been fitted to cave entrances to prevent disturbance. Some caves are also subject to occasional flooding (e.g. Kiltartan Cave) which make them temporarily unsuitable for bats. This is considered to be a natural phenomenon in karstic landscapes. Given the general good status of the Lesser Horseshoe Bat in caves in Ireland, expert opinion has been relied on to conclude that the condition of this habitat is good overall. There is no change in this parameter since the last reporting period, however focused research on the ecology and population biology of the Lesser Horseshoe Bat in Irish cave systems would be useful to better inform our assessment here.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PX04 No pressures or threats			

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Although individual caves may be subject to disturbance (e.g. dumping, vandalism) and winter flooding can lead to some mortalities of bats in certain karst caves, no significant pressures or threats have been identified for this habitat nationally.

8 Conservation measures

8.1 Status of measures	*Are measures needed? - YES/**NO*** *If no, a justification must be provided in free text field 8.7*
8.2 Scope of measures taken	
8.3 Main purpose of the measures taken	
8.4 Location of the measures taken	
8.5 Response to the measures	
8.6 List of main conservation measures	None
8.7 Additional information *Optional*	Although individual caves may be subject to disturbance (e.g. dumping, vandalism) and winter flooding can lead to some mortalities of bats in certain karst caves, no significant pressures or threats have been identified for this habitat nationally.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	No threats or pressures have been identified which are considered likely to have a significant impact on the range, area, or structure and functions of this habitat in Ireland. Overall, the Future prospects for this habitat are considered to be *Favourable*. Although the overall conservation assessment for the Lesser Horseshoe Bat in Ireland is *Unfavourable-Inadequate* due to a gap in range, the cause of this range gap does not appear to relate to the availability or quality of cave habitat. Most of the important cave sites are protected as SACs. Many vulnerable bat caves are already protected from disturbance through grilling. Regular monitoring is underway and if further vulnerable cave sites are identified these will also be grilled.	

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* ***improving*** */ deteriorating / stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*

	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data / the use of a different method / unknown/ other reasons*	*The change is mainly due to (select only one option):* ***genuine change** / improved knowledge or more accurate data / the use of a different method /unknown/ other reasons*
10.8 Additional information *Optional*	Although individual caves may be subject to disturbance (e.g. dumping, vandalism) and winter flooding can cause mortalities of bats in certain caves, no significant pressures or threats have been identified for this habitat nationally. Range, Area, and Structure and functions of this habitat in Ireland are all considered to be *Favourable* and *stable* or *increasing*. Overall, the Future prospects for this habitat are considered to be *Favourable*. Although the overall conservation assessment for the Lesser Horseshoe Bat in Ireland remains *Unfavourable-Inadequate*, this is due to a previous contraction in range in Limerick and North Kerry and is not related to cave habitat quality or availability. Most of the important cave sites are protected as SACs. Many of the vulnerable bat caves are already protected from disturbance through grilling. Regular monitoring is underway to identify further vulnerable cave sites and where necessary these will also be grilled. Consequently, and although the Overall Status of the typical species (Lesser Horseshoe Bat) remains *Unfavourable-Inadequate*, this cave habitat has been assessed as *Favourable*. The trend is *improving*, which is a change from the last monitoring period. This is due to the expansion in range of the Lesser Horseshoe Bat. Further research would be useful, however, to determine the aspects of cave structure and function (e.g. size, air-flows, light, humidity, temperature regimes, hydrology) which are critical for bat utilisation in the Irish context.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

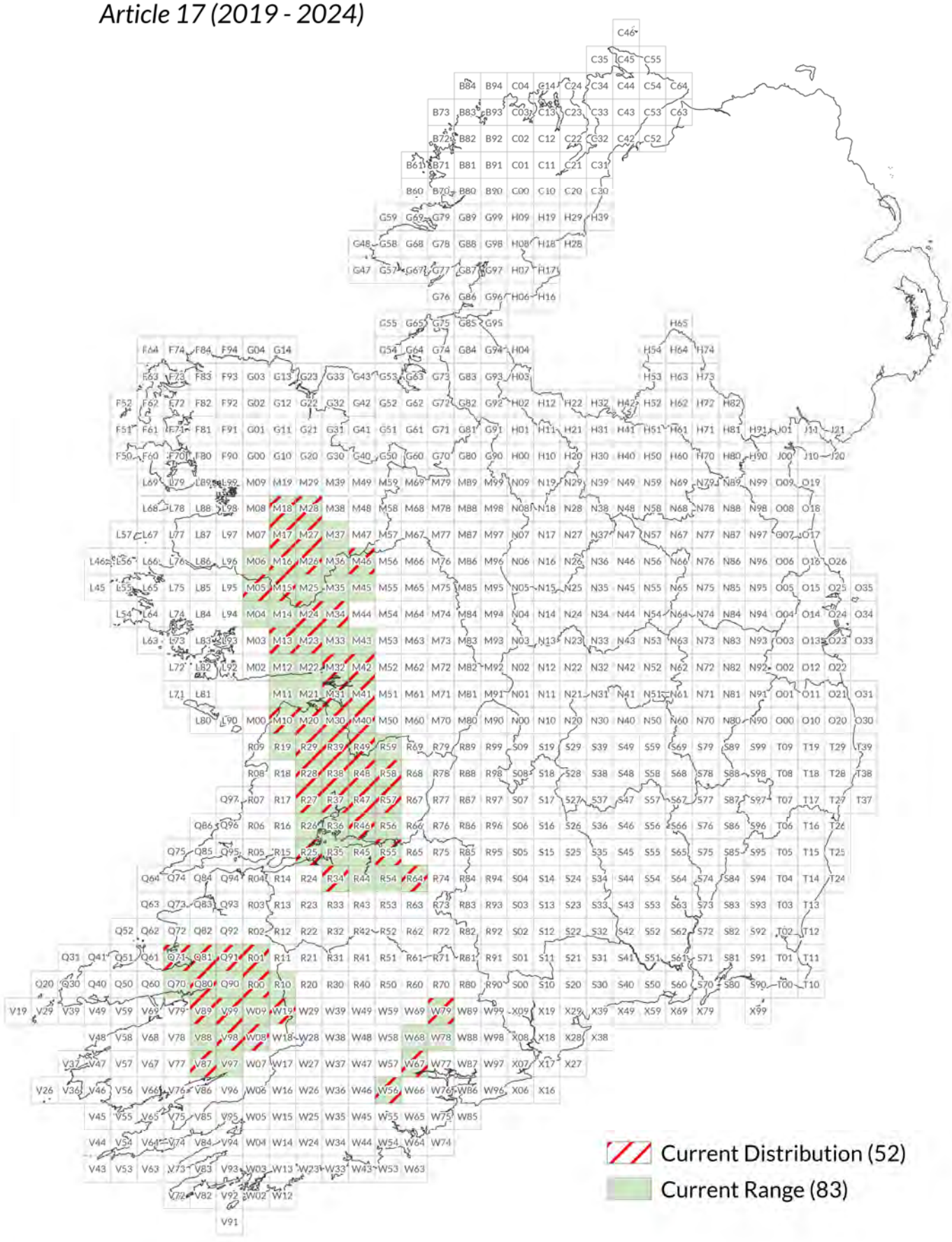
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.0037 km²***
11.2 Type of estimate	***Best estimate** / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.4 Short-term trend of habitat area within the network **Direction**	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / **increasing** / decreasing / uncertain/ unknown*
11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* ***b) increasing*** *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*
11.8 Additional information *Optional*	To calculate the area within the network, Lesser Horseshoe Bat distribution data were overlapped with the GSI cave dataset to produce the range of this habitat. A total of 88 caves with records of Lesser Horseshoe Bat were identified within this area. When the SAC network was overlain on top, 37 of those caves were found to fall within the overlap. As used for the calculation of area of the habitat (section 5.2), each cave has been given a nominal area of 100 m^2. Total area within the SAC network is 37 x 100 m^2 = 0.0037 km^2. This figure is larger than the one reported in 2019 due to some extent to the increase in the range of the Lesser Horseshoe Bat, but the increase is mainly due to better data.

12 Complementary information *N/A*

Caves (8310)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**8330 Submerged or partially submerged sea caves**
1.2i Habitat short name	**Sea caves**
1.3 Habitat description	In Ireland, sea caves [8330] are defined as caves which are fully submerged below sea level, or which have an intertidal component to them (i.e. partially submerged caves). Their walls, roof and floor support species communities similar to those of reef habitats [1170] but adapted to the specific physical attributes of sea caves. The entrances of sea caves usually occur on sea cliff faces, with the cave extending both above and below sea level. A number of sea caves are known to be completely submerged, others form tunnels or caverns. Some sea caves, such as Poll na bPéist, Inis Mór, Co. Galway, have openings both below sea level and on the surface. In Ireland, while sea caves are found in association with reefs [1170], they appear to present a marked difference from the surrounding reef habitat due to their different physical characteristics such as inclination, wave surge, scour, and shade. These can change rapidly from the cave entrance to the inner parts of the cave leading to a marked zonation in the communities present. The communities of the entrance area of sea caves are quite similar to exposed intertidal and subtidal reef communities. Where a bank of boulders or other hard substrate is present at the back of a cave and where the area is not continually submerged, it may be used as a haul-out area by Grey Seals. Sea caves appear to be extensive around the coast of Ireland. The west coast of Ireland has a varied geology that includes large areas of limestone bedrock, which is particularly suitable to the formation of sea caves. This geology, together with extreme exposure, provides one of the main physical processes required for the formation of sea caves. Sea caves are also known to occur on the south and north coasts of Ireland where they can be found on the mainland and also on many of the islands and islets surrounding the coast. While more limited in their distribution, sea caves are also known to occur in some parts of the east coast of Ireland, particularly around Lambay Island off the coast of north County Dublin. However, their distribution along the south-east coast appears to be limited due to geological factors.

2 Maps

Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2007-2024***
2.2 Distribution map	Submitted

2.3 Distribution map Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The primary source of data in relation to sea caves in Ireland was the 2003 oblique aerial survey of the coast of Ireland conducted by DCENR. These data were compiled to identify areas of coastal erosion but the resultant topographic imagery also provided a method to visualise potential sea caves. Some shortfalls with the use of oblique aerial imagery are associated with its lack of ability to fully distinguish between indentations in vertical reef habitats and true sea caves. This method does not provide a means to identify subtidal sea caves. However, it provides a reasonable proxy for the likely distribution of sea caves in Ireland. This was supplemented by NPWS Site-Specific Conservation Area spatial data where available. Manual edits were carried out based on expert opinion.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* *Atlantic,* ***Marine Atlantic***
3.2 First time reporting	*YES/**NO***
3.3 Additional information	Bell, J.J. (2007) The ecology of sponges in Lough Hyne Marine Nature Reserve (south-west Ireland): Past, present and future perspectives. *Journal of the Marine Biological Association of the United Kingdom*, 87, 1655-1668. Bell, J. J. & Barnes, D. K. A. (2000) A sponge diversity centre within a marine island, *Hydrobiologia*, 440, 55-64. Bunker, F.StP.D. and Holt, R.H.F. (2003) Survey of Sea Caves in Welsh Special Areas of Conservation 2000 to 2002*,* A report to the Countryside Council for Wales by *MarineSeen*, Pembrokeshire. CCW Marine Monitoring Report No: 6, 184pp. Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northern, K.O. & Reker, J.B. (2004) *The Marine Habitat Classification for Britain and Ireland,* Version 04.05. Joint Nature Conservation Committee (JNCC), Peterborough ISBN 1 861 07561 8 (internet version). http://www.jncc.gov.uk/MarineHabitat Classification.

	JNCC (2004) Common Standards Monitoring Guidance for Sea Caves. Version August 2004. Joint Nature Conservation Committee, Peterborough UK. Picton B.E., Emblow, C.S., Morrow, C.C., Sides, E.M., Tierney, P., McGrath, D., McGeough, G., McCrea, M., Dinneen, P., Falvey, J., Dempsey, S., Dowse, J. & Costello, M. J. (1997) Marine sites, habitats and species data collected during the BioMar survey of Ireland. Renouf, L.P.W (1934) The effect of light on the colour of *Pachymatisma johnstonia* (Bowerbank), *Journal of Natural History Series*, 13(75), 336-338. Harries, D.B., Purcell, A., Moore, C.G., Lyndon A.R., Porter, J.S., Saunders, G.R. & Hume, C.L. (2024) Distribution mapping and baseline monitoring survey of sea caves around Fair Isle. NatureScot Research Report 1145. https://www.nature.scot/doc/naturescot-research-report-1145-distribution-mapping-and-baseline-monitoring-survey-sea-caves-around#1.5+Condition+monitoring+of+sea+caves.
3.4 Sources of information	CMRC (2006-12) *Marine Irish Digital Atlas*. Coastal and Marine Resources Centre (CMRC), ERI, University College Cork, http://mida.ucc.ie/. DCENR (2013) Spatial data for seismic surveys and hydrocarbon wells, Department of Communications, Energy and Natural Resources, http://gis.dcenr.gov.ie/internetIPAS/servlet/internet/IPAS2IHome. DCENR (2003) Coast of Ireland, 2003 Oblique Imagery Survey Viewer, Department of Communications, Energy and Natural Resources, https://www.floodinfo.ie/map/coastal_map/. EPA (2013) EPA Ireland GeoPortal. https://gis.epa.ie/GetData MERC (2010) Irish Sea Reef Survey. A report to the National Parks and Wildlife Service, MERC Consultants Ltd., 32 pp. MERC (2012) Survey of Irish Sea Caves. A report to the National Parks and Wildlife Service, MERC Consultants Ltd., 43 pp. NPWS (2010) A desk study of intertidal sea caves. Unpublished report. NPWS (2011/2) Conservation Objective Series. ISSN 2009-4086.2.3. Scally, L., Pfeiffer, N.J., and Hewitt, E. (2020) The Monitoring and Assessment of six EU Habitats Directive Annex I Marine Habitats, *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***13,100 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***1994-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	

4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
4.12 Favourable reference range	***a) 13,100 km²***	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ *approximately equal to the favourable reference range (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ ***Model-based approach***	*Indicate the quality of information available: high/**moderate**/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	The Favourable Reference Range has been set as the current range as there is no evidence of decline since the Directive came into force. This range is likely to encompass all geographical, geological and ecological variation of Irish sea caves.	
4.14 Additional information *Optional*	Range was estimated based on partial data with some extrapolation and/or modelling. Mapping these features is very difficult, particularly as some may be below the low water mark. Detection and monitoring is challenging with current technology. There is no evidence of any genuine change to the range of this habitat feature in Ireland.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***2007-2018***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***Not known***

5.3 Type of estimate		
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* ***d) Insufficient or no data available***	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* ***a) no, there is no change*** *b) yes, due to genuine change* *c) yes, due to improved knowledge/more accurate data* *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
5.6 Short-term trend Period	***2007-2018***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***1994-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*	
5.15 Favourable reference area	*a) In km² or*	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Expert opinion*	
	☐ *Other (Elaborate in Additional information 5.17)*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	A count of the apparent sea cave habitat in Ireland indicates a total of 1,603 sea caves. However, it is likely this may be an overestimate. Potential sea caves were identified based on oblique aerial imagery and it has now become evident that this method may not have had the power to distinguish between indentations in vertical or sloping reefs [1170] and vegetated sea cliffs of the Atlantic and Baltic coasts [1230] and true sea caves [8330]. Identification of sea caves which are fully submerged is particularly difficult and likely to remain a challenge into the future. Short-term and long-term trends were estimated based on best expert judgement. It is considered highly unlikely that the area of this habitat will change significantly due to the physical and geological nature of the habitat. Surveys completed for the habitat to date have included the likely variation in the physical (including geographical and geological) structure of the habitat and therefore the ecological variation.	

	The 3-dimensional structure, together with the largely inaccessible nature of many sea caves, makes the calculation of habitat area a particular challenge. Surveys of Irish sea caves undertaken since 2012 have been designed to measure the total area of rock habitat within each sea cave surveyed. The total surface area of rock habitat within each sea cave was estimated based on the length, width and height of the cave measured by divers using a calibrated line. In order to capture the additional surface area created by undulating surfaces, crevices, overhangs and boulders within the cave system, a raising auxiliary to more accurately indicate the likely surface area of habitat within the cave was applied. Without more detailed surveys, it was not possible to definitively suggest a suitable or appropriate auxiliary, so this was based on the reasoned instinct of the survey team. While the area of the total resource is likely to remain a challenge, the area of all sea caves monitored in the future will provide a better estimate of the resource on a local scale. Only six sea caves have been surveyed in detail and this is not considered a sufficient number to allow current areas to be scaled up to a national estimate.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***Unknown***
		Maximum	***Unknown***
	b) Area in not-good condition	**Minimum**	***Unknown***
		Maximum	***Unknown***
	c) Area where condition is not known	**Minimum**	***Unknown***
		Maximum	***Unknown***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* ***d) Insufficient or no data available***		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* ***c) Based mainly on expert opinion with very limited data*** *d) Insufficient or no data available*		

6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The typical species of sea caves in Ireland are known for only a limited number of locations. They had been found to be dominated by *Alcyonium digitatum*, *Aspersa conchilega*, *Botrylloides leachi*, *Botryllus schlosseri*, *Bugula flabellata*, *Caryophyllia smithii*, *Cerianthus lloydii*, *Clathrina coriacea*, *Cliona celata*, *Corynactis viridis*, *Crisiidae* sp., *Dendrodoa grossularia*, *Dercitus bucklandi*, *Echinus esculentus*, *Haliclona viscosa*, *Holothuria forskali*, *Obelia geniculata*, *Ophiactis balli*, *Pachymatisma johnstonia*, *Palaemon serratus*, *Peachia cylindrica*, *Sagartia elegans*, *Spirorbidae* sp., *Stelligera rigida*, *Thymosia guernei*, and *Urticina felina.* Other species recorded during surveys with relative abundance included: *Pentapora foliacea*, *Clathrina coriacea, Aplysilla rosea, Haliclona simulans, Hemimycale columella, Palaemon serratus, Balanus balanus, Spirobranchus triqueter, Henricia oculata, Marthasterias glacialis, Nemertesia antennina*, *Antedon bifida, Tubularia indivisa, Thyone roscovita* and *Aplidium punctum.*
6.8 Additional information **Optional**	Sea caves are essentially a subclass of reef habitat [1170]. However, they have the potential to exhibit a different species assemblage from that of the surrounding reef habitat due to the unique physical characteristics of sea caves, especially with respect to shading and scour. In particular, the lack of a significant algal community in sea caves, when compared to the surrounding reef habitat, is notable. The physical 3-dimensional structure of sea caves also creates additional micro-habitats and a much larger surface area than that of the adjacent reef habitat.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PX04 No pressures or threats			

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	N/A
7.2 Methods used *Optional*	
7.3 Sources of information *Optional*	-
7.4 Additional information	Pressures were ranked based on the level of importance in ascending order from 1, with 1 being the highest importance. Only pressures that were ranked as High, Medium-High, or Medium are included.

Optional	Sea caves are considered to be relatively protected from direct anthropogenic impact, largely due to the inaccessibility of their locations. Furthermore, all sea caves in Ireland are formed from geogenic hard rock habitats, making them unlikely to be vulnerable to change. Other than the minor alteration of the rock face due to the effects of natural erosion, habitat loss is highly improbable. No pressures or threats with a ranking of medium or higher have been identified for this habitat.

8 Conservation measures

8.1 Status of measures	*Are measures needed? (YES/**NO**)* *If no, a justification must be provided in free text field 8.7*
8.2 Scope of measures taken	
8.3 Main purpose of the measures taken	
8.4 Location of the measures taken	
8.5 Response to the measures	
8.6 List of main conservation measures	None
8.7 Additional information *Optional*	Conservation measures for sea caves will have to be a focus of the next reporting cycle. A first step will include further exploration and categorisation of this habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	***Good*** */ Poor / Bad / Unknown*
9.2 Additional information *Optional*	Short-term trend direction of Range is assessed as *stable*. Current range is equal to Favourable Reference Range. Conservation status of Range is therefore *Favourable*. Future trend of Range is assessed as *stable*, as no change in range is expected based on the balancing of the threats and conservation measures that are currently in place. Further, the physical and geological nature of the habitat makes a change in range unrealistic. Future prospects of Range are therefore *Good*. Short-term trend direction of Area is assessed as *stable*. Even though the current area is unknown, the potential for a significant change (increase or decrease) in the area is considered highly unlikely in the medium term. Conservation status of Area is therefore *Favourable*.	

	Future trend of Area is assessed as *stable*, as no change in area is expected based on the current threats, conservation measures and physical structure of the habitat. Future prospects of Area are therefore *Good*. Short-term trend direction of Structure and functions is *stable*. Even though the typical species composition is unknown, the information obtained from previous (1993 to 2018) surveys are considered to be the baseline to provide better information on the characterisation of the fauna and ecology of sea caves. Conservation status of Structure and functions is therefore *Favourable*. No known pressures causing a significant impact on ecological processes have been observed. No significant threats to the habitat are known. Future prospects of Structure and Functions are therefore *Good*.

10 Conclusions		
Assessment of conservation status at end of reporting period		
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.4 Future prospects	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating /* ***stable*** */ unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information	Sea caves remain one of the most challenging habitats to survey and therefore an assessment of their conservation status is difficult. It is	

Optional	likely that a very large number of sea caves around the Irish coast are completely submerged and unknown. Without considerable exploration it is unlikely that the full extent of the national resource will ever be known. Of the known sea caves, generally those that are partially submerged, there are insufficient baseline data upon which to fully describe the habitat or its typical species and species communities. Only a small sub-sample (six caves) has been surveyed in detail. This sample is not considered large enough to accurately assess their Structure and functions or extrapolate the likely total area of the habitat. Further effort to survey sea caves will be required in the next reporting cycle. A number of factors make sea caves unlikely to be vulnerable to change. Foremost, all sea caves in Ireland are formed from geogenic hard rock habitats. Therefore, other than minor alteration of the rock face due to the effects of natural erosion, habitat loss is highly improbable. The inaccessible nature of sea caves also makes them less vulnerable to anthropogenic impacts. No pressures or threats have been identified with a ranking of medium or higher for this habitat. Notwithstanding the lack of detailed baseline information for submerged or partially submerged sea caves, their conservation status has been assessed as *Favourable*. This is based on the clear lack of pressures on the sea caves to date and the lack of any future threats which could impact on their conservation status.

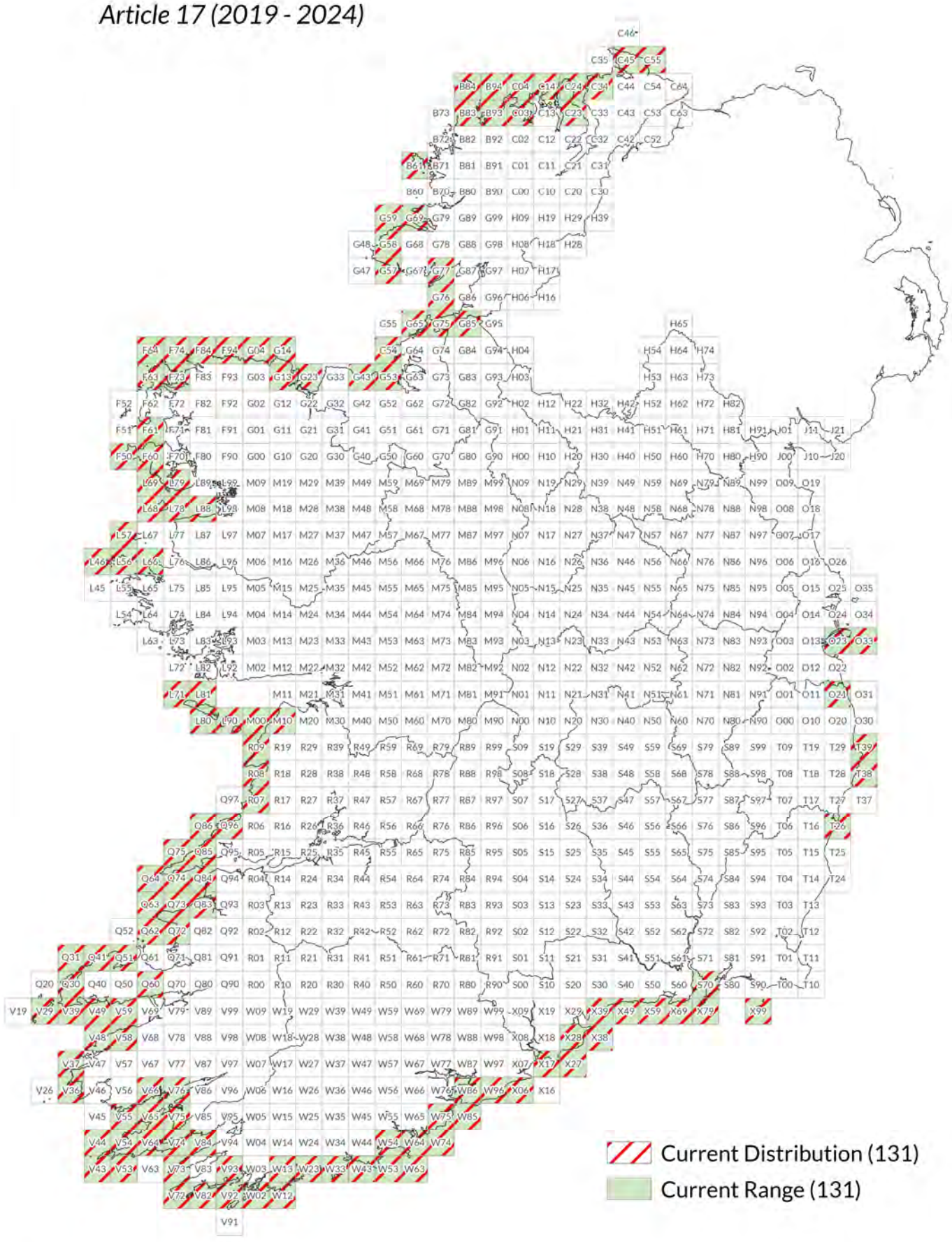
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***Unknown***
11.2 Type of estimate	*Best estimate / 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* ***d) Insufficient or no data available***	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	

11.5 Short-term trend of habitat area within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	The area is *unknown* as it is not possible to assign an area to sea caves given the noted difficulties associated with the resource. It should be noted that 685 sea caves are within the network, with 336 sea caves within sites that list sea caves as a qualifying feature. Although the area in good condition has not been quantified, there are no significant pressures operating and therefore the trend is set as *stable*.

12 Complementary information *N/A*

Sea caves (8330)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles**
1.2i Habitat short name	**Old oak woodland**
1.3i Habitat description	The Interpretation Manual of European Union Habitats (European Commission, 2013) gives little information on acidophilous *Quercus petraea* woods that conform to Annex I habitat 91A0 beyond describing the habitat as having "many ferns, mosses, lichens and evergreen bushes … including *Arbutus unedo*", and only lists three indicative taxa: *Quercus petraea, Ilex aquifolium* and *Blechnum* spp. A broader interpretation of the habitat has been taken for the assessment reported here to include woods with *Quercus* × *rosacea* (the hybrid between *Q. petraea* and *Quercus robur*) and, in a small number of cases, *Quercus robur* itself, provided the ground flora is acidophilous in nature; ideally, however, *Q. petraea* should also be present. Effectively, all three phytosociological sub-associations of the Blechno-Quercetum petraeae association described by Kelly & Moore (1975) are regarded as the Annex I habitat: sub-association typicum, sub-association scapanietosum and sub-association coryletosum. An old sessile oak wood is characterised by a number of diverse elements coming together in a fully functioning system. The soil is usually acidic, often a podzol, brown earth or grey-brown podzol, and generally well drained. This supports a characteristic flora. The woodland itself is typically multi-layered, with well-developed sessile oak woods having a canopy, understorey, shrub, dwarf shrub, field and ground layers. A good proportion of the canopy should be composed of *Quercus petraea* or the hybrid *Quercus* × *rosacea*, although other native species such as *Betula* spp. and *Sorbus aucuparia* also occur. The understorey and shrub layers, if present, are generally made up of shorter and/or younger individuals of the above species, with *Ilex aquifolium* and *Corylus avellana* generally frequent in the shrub layer. A dwarf shrub layer of low woody species such as *Vaccinium myrtillus* and *Calluna vulgaris* often occurs. A field layer of ferns such as *Blechnum spicant*, *Polypodium* spp. and *Dryopteris* spp., and flowering plants such as *Luzula sylvatica* and *Oxalis acetosella* are typical. *Hyacinthoides non-scripta* may be present on more nutrient-rich soils. The ground (bryophyte) layer is usually well developed, consisting of a diverse range of mosses, including *Rhytidiadelphus* spp., *Dicranum* spp., *Polytrichum formosum, Loeskeobryum brevirostre, Mnium hornum, Plagiothecium undulatum, Pseudotaxiphyllum elegans*, and liverworts such as *Diplophyllum albicans, Saccogyna viticulosa* and *Scapania* spp. Other liverwort species, such as *Calypogeia* spp., *Frullania* spp. *Plagiochila* spp., *Lepidozia* spp. and *Bazzania trilobata*, may also occur, particularly in western sessile oak woodlands where epiphytes are typically abundant.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***1995-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map produced for the 2007-2012 reporting period (NPWS, 2013) utilised the following sources: Kearney (2008), O'Neill *et al.* (2010), Daly & Perrin (2010), Barron & Perrin (2011), Cross (2011), Cross (2012), NPWS (2012), Perrin *et al.* (2014b), Roche *et al.* (2014), the Habitat Assignment Project (NPWS, unpublished) and various individual site synopses. The distribution map produced for the 2013-2018 reporting period (NPWS, 2019) built on the previous one and utilised the following additional sources: Lynch (2005), Crushell & Foss (2010), Perrin *et al.* (2014a), Daly *et al.* (2015), Devaney *et al.* (2017), Forest Service (2018), Daly *et al.* (2023) and the Coillte Biodiversity Dataset (various dates). The distribution map produced for the 2019-2024 reporting period built on the previous ones and utilised the following additional sources: Forest Service (2022), Perrin *et al.* (in prep. a), Perrin *et al.* (in prep. b) and O'Neill *et al.* (2024). It comprises 246 10x10 km grid cells, up slightly from the 243 cells reported in NPWS (2019). A certainty score with a range of 1-3 had been applied to all data that informed the distribution map in previous reporting periods. For this reporting period, a range of 1-4 was used whereby 4 is the highest certainty and 1 the lowest. A value of 4 was reserved for recent woodland surveys that specifically mapped habitat 91A0; this value was applied to all new data, with the exception of some records from O'Neill *et al.* (2024) that had been based in part or wholly on aerial imagery interpretation. Certainty values from the datasets utilised during the previous reporting periods were not re-evaluated. All data sources with certainty 1-4 were used to map the distribution of the 91A0 habitat. Some data previously used in determining the distribution are now over 25 years old. These data have been retained but field verification of the occurrence of 91A0 habitat at these sites is recommended for the next reporting period.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Barron, S.J. & Perrin, P.M. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Coillte Biodiversity Dataset (various dates) GIS files and individual site management plans were made available by Coillte. Datasets used were from 2001 to 2005. Crushell, P. & Foss, P.J. (2010) Reenagross Park, Kenmare, Co. Kerry. Baseline Ecological Surveys and Biodiversity Conservation Plan. Report prepared by Wetland Surveys Ireland for Kenmare Tidy Towns. Cross, J. (2011) River Barrow and River Nore SAC (site code 2162) Conservation objectives supporting document - woodland habitats. https://www.npws.ie/sites/default/files/publications/pdf/002162_Barrow%20Nore%20SAC%20Woodlands%20Supporting%20Doc_V1.pdf. Accessed September 3rd 2018. Cross, J. (2012) River Blackwater (Cork/Waterford) SAC (site code 2170) Conservation objectives supporting document - woodland habitats. https://www.npws.ie/sites/default/files/publications/pdf/002170_Blackwater%20River%20%28Cork-Waterford%29%20Woodland%20Supporting%20Doc_V1.pdf. Accessed September 3rd 2018. DAFM (2023) Irish Deer Management Strategy Group Final Report into Developing a Sustainable Deer Management Strategy for Ireland. Department of Agriculture, Food and the Marine, Dublin. https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/report-of-the-deer-management-strategy-group/. Daly, O.H., Barron, S.J., Perrin, P.M. & Roche, J.R. (2015) Blanket bog turf-cutting management system: Site Report No. 4 Cloghernagore Bog and Glenveagh National Park SAC (002047). Unpublished report to the National Parks and Wildlife Service. Daly, O.H., O'Neill, F.H. & Barron, S.J. (2023) The monitoring and assessment of four EU Habitats Directive Annex I woodland habitats. *Irish Wildlife Manuals*, No. 146. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin.

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4 Range

Range within the biogeographical/marine region concerned

4.1 Surface area	***40,800 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown*

	e) other reasons	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km² or*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	

	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.	
4.14 Additional information *Optional*	Range was calculated using the range tool algorithm. The higher figure reported in this period (up by 500 km^2) is due to improved data. There is no indication that losses of area reported in this or previous reporting periods have resulted in a contraction of the range in the short-term or long-term trend periods. The Favourable Reference Range (FRR) is deemed to be approximately equal to the current range.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1995-2023***	
5.2 Surface area *(in km^2)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***53.91 km^2***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown*	

	f) yes, due to other reasons	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/* ***pre-defined range***	
5.10 Short-term trend Method used	*Select one of the following methods:* a) Complete survey or a statistically robust estimate ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	

5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 399 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other*	
5.16 Surface area when Directive came into force *Optional*		
5.17 Additional information *Optional*	The current area for this habitat is lower than that reported in NPWS (2019), down by 6.17 km² from 60.08 km². The reasons for this difference are fourfold. Firstly, there have been some genuine losses in area as detailed below. Secondly, recent survey work has refined the mapping of the habitat at several sites. Thirdly, in a change from the previous habitat definition, sites where dense *Rhododendron ponticum* infestation has eliminated the shrub and field layers are no longer deemed to qualify as the habitat and have been dropped from the distribution (e.g., Kylemore Abbey, Glena and parts of Glengarriff Woods Nature Reserve). Fourthly, and most significantly, the accuracy of data incorporated from the National Survey of Native Woodlands (O'Neill *et al*., 2010) has been improved. In NPWS (2013) and NPWS (2019), if habitat 91A0 occurred within a polygon as a component of a mosaic, the entire area of polygon was treated as being habitat 91A0. Percentage data on mosaics from O'Neill *et al.* (2010) have now been used to more accurately reflect the abundance of the habitat.	

	Area was calculated thus: 53.46 km^2 from polygons + 0.45 km^2 from points, there being 18 points that do not intersect with those polygons and each representing a nominal area of 2.5 ha. Area loss was calculated using two alternative methods. Method 1 extrapolates from data on area losses within the monitoring network. This is a standardised approach but has the potential for underestimation due to the likely highly skewed distribution of area loss data (i.e. most sites have no losses but there are potentially large losses at a small number of sites). Method 2 which is based on total known losses was therefore used as a safeguard to ensure that area loss is not underestimated. *Method 1. Extrapolation from the monitoring network.* The 63 91A0 sites in the monitoring network contained 478.41 ha of woodland at the start of the current monitoring period. The 1.84 ha of loss therefore represents 0.38% of that resource. Extrapolating this figure to the national scale yields an estimated loss of 20.6 ha. *Method 2. Total known losses.* For the current reporting period, 63 sites in a monitoring network for 91A0 were surveyed and assessed for area loss. In total, 1.84 ha of loss was reported across six of the sites through a combination of field observations and satellite imagery analysis. During this analysis, a further 0.78 ha of habitat loss outside the monitoring network was incidentally detected. In addition, Perrin *et al.* (in prep. a) reported losses of 2.01 ha of 91A0 in the Killarney National Park due to fire damage and senescence and Perrin *et al*. (in prep. b) reported losses of 12.1 ha of 91A0 at Toon Valley Woods due to felling. Total known losses for this period are therefore 16.73 ha, or 0.31% of the national resource at the start of this reporting period. Method 1 is therefore not an underestimate and was used as the estimate of area loss for the current reporting period. For the 2013-2018 reporting period, the same 63 91A0 sites were surveyed and assessed for area loss (NPWS, 2019; Daly *et al.*, 2023). No losses were recorded by that survey. As part of the current assessment, satellite imagery analysis was conducted to confirm this. This resulted in the detection of minor losses of 0.11 ha within the network within the 2013-2018 period. A further 0.07 ha of habitat loss outside the monitoring network was incidentally detected. For the 2007-2012 reporting period, 61 91A0 sites were surveyed and assessed for area loss (NPWS, 2013; O'Neill & Barron 2013). No losses were recorded. As part of the current assessment, satellite imagery analysis was conducted to confirm this. It did, but losses of 0.49 ha were incidentally noted outside the monitoring network. Furthermore, as reported in NPWS (2019), analysis of the DEFORMAP dataset (Devaney *et al*., 2017) indicates 4.2 ha of 91A0 loss during this period and a further 1.5 ha of loss in the period 2001-2006. Initiatives such as the People's Millennium Forest and the Native Woodland Scheme have established new sessile oak woods in Ireland over the past 25 years. However, these measures cannot yet be classed as area gains for habitat 91A0 due to the length of time it takes for old sessile oak woodland to develop (NPWS, 2013), with planted sites taking 100+ years to recreate the character and functionality that

	is typical of this Annex I habitat. It should be noted that the monitoring network does not detect increases in area. The Favourable Reference Area (FRA) was set at 1% of the Favourable Reference Range (FRR) for the first and second reporting periods (NPWS 2007, 2013). The FRA for 2013 was 399 km^2. This was retained in 2019 and for the current reporting period. Current surface area (53.91 km^2) is only 13.5% of the FRA. This difference reflects both the exceedingly high rates of historical deforestation in Ireland and the high rate of fragmentation of the remaining resource. As well as area increases, greater connectivity needs to be established to increase gene and species flow between woodlands (NPWS, 2013).

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***19.19 km²***
		Maximum	***19.19 km²***
	b) Area in not-good condition	**Minimum**	***34.72 km²***
		Maximum	***34.72 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period?* ***YES****/NO* *If yes, provide the updated list as an additional spreadsheet and fill field 6.7*		

6.7 Typical species Method used *Optional*	The presence of typical species within four 20 m x 20 m plots was recorded for each of the assessment sites. Typical species were assessed by four sub-criteria: (i) the presence of at least one target species (*Quercus petraea, Quercus robur, Quercus* × *rosacea*) (ii) the presence of at least two species of bryophyte (from a list of ten taxa, treating *Dicranum scoparium* and *Dicranum majus* as a single taxon), (iii) the presence of at least two non-target species of trees (from a list of four), (iv) the presence of at least two other positive species (from a list of seven). Previously, the sub-criteria were: (i) the presence of at least one target species (*Quercus petraea, Quercus* × *rosacea*), (ii) the presence of at least six positive species (from a list of 21), (iii) at least two of the species noted under (ii) must be bryophytes (from a subset of ten taxa). *Quercus robur* was added to the list of typical species. Stands with this species are included in the Irish interpretation of the habitat but this was not reflected in the previous list. Past management in some Irish oakwoods has resulted in a lack of native tree species diversity and associated structural complexity. The other changes therefore reflect a requirement for diversity in stand composition and the field layer. Taxa included on the current list of typical species are as follows: *Quercus petraea* (target species), *Quercus robur* (target species), *Quercus* x *rosacea* (target species), *Betula pubescens, Corylus avellana, Ilex aquifolium, Lonicera periclymenum, Sorbus aucuparia, Vaccinium myrtillus, Blechnum spicant, Luzula sylvatica, Oxalis acetosella, Hyacinthoides non-scripta, Polypodium* spp.*, Dicranum majus/Dicranum scoparium, Diplophyllum albicans, Loeskeobryum brevirostre, Mnium hornum, Plagiothecium undulatum, Polytrichum formosum, Pseudotaxiphyllum elegans, Rhytidiadelphus loreus, Saccogyna viticulosa* and *Scapania gracilis.*
6.8 Additional information *Optional*	During the current reporting period, 63 sites were assessed for Structure and functions. At site level, a 'Green' assessment resulted if all plots passed at the individual-plot level and the four-plot level was also passed. One failure out of these five assessments resulted in an 'Amber' assessment. More than one failure resulted in a 'Red' assessment (Perrin & Barron, in prep.). For this reporting period, sites with an 'Amber' or 'Red' assessment were considered to be in need of condition improvement and the site as a whole was assessed as 'not good'. Twenty-three sites received a 'Green' (good) assessment, with these sites representing 35.6% of the total assessed area. Forty of the sites received an 'Amber' or 'Red' (not good) assessment, with these sites representing 64.4% of the total assessed area. The figures reported in section 6.1 were reached by applying these percentages to the habitat area reported in section 5.2. A similar approach was applied to data from previous reporting periods. In 2019, 35.0% of the habitat was good and 65.0% was not good. In 2013, 33.6% was good and 66.4% was not good. The changes to the typical species criterion did not impact the current area in good condition. Consequently, the short-term trend is deemed to be relatively *stable*, as it was previously.

	During the current reporting period, the least frequently passed criteria pertained to negative species cover (66.3% of plots passed), native shrub layer cover (66.3% of plots passed), the presence of native *Quercus* saplings (39.7% of sites passed) and the regeneration of native trees and shrubs (50.8% of plots passed).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PB05 Logging without replanting or natural regrowth	Ongoing and likely to be in the future	Minority <50%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	High
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	High
PM01 Storm or cyclone	Ongoing and likely to be in the future	Minority <50%	High
PB06 Logging or thinning (excluding clear cutting)	Ongoing	Minority <50%	Medium
PA07 Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	Minority <50%	Low
PA13 Application of natural or synthetic fertilisers on agricultural land	Ongoing and likely to be in the future	Minority <50%	Low
PA19 Agricultural activities generating soil pollution	Ongoing and likely to be in the future	Minority <50%	Low
PB07 Removal of dead and dying trees (including debris)	Ongoing and likely to be in the future	Minority <50%	Low
PB18 Use of other pest control methods in forestry (e.g. physical plant protection)	Ongoing and likely to be in the future	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low
PG10 Harvesting or collecting of wild plants, fungi and animals on terrestrial land	Ongoing and likely to be in the future	Minority <50%	Low
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	Low
PI04 Plant and animal diseases, pathogens and pests	Ongoing and likely to be in the future	Minority <50%	Low
PH04 Vandalism or arson (incl. human-introduced wild fire)	Only in the future		

e) Invasive alien species of Union concern	*Gunnera tinctoria* was recorded from one (2%) monitoring site
f) Other invasive alien species *Optional*	Species present include *Fagus sylvatica, Acer pseudoplatanus, Aesculus hippocastanum, Rhododendron ponticum, Reynoutria japonica, Prunus laurocerasus, Abies alba, Picea sitchensis, Abies procera, Castanea sativa, Larix decidua, Pseudotsuga menziesii*. For the purposes of categorisation, deer are classified as non-native, with

	the exception of Red Deer (*Cervus elaphus*) within Killarney National Park. These were recorded from 27 of the monitoring sites (42%).
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Pressures and threats were selected and ranked based on intensity (high, medium or low), frequency of occurrence, and area of impact, using the data gathered during the 2023-2024 Woodland Monitoring Survey as presented in Perrin & Barron (in prep.). Other invasive alien plants (PI02) were recorded from 52 monitoring sites (82%) with the influence being high at 18 sites and medium at 25. Browsing by deer was recorded from 27 sites (43%) with the influence being high at nine sites and medium at seven. This was recorded under PI03 'Problematic native species' for Red Deer within Killarney National Park and under PI02 'Other invasive alien species (other than species of Union concern)' for other instances. Problematic native plant species (PI03) was recorded at one site (2%) where excessive *Rubus fruticosus* agg. occurred. Ash dieback was recorded from seven sites (11%) with the influence recorded as medium at four and low at three. Wildfires were regarded as a threat at two sites (3%) within the monitoring network. Impacts of livestock within woodlands (PA07) was recorded at seven sites (11%). For the majority of instances, the influence was low, but it was high and medium at one site each. Logging without replanting or natural regrowth (PB05) was recorded from six sites (10%) where there had been loss of habitat area and thus the influence was high. Logging or thinning (excludes clear cutting) (PB06) was recorded from a single site (2%) with medium influence. Impacts from walking and leisure activities (PF05) was recorded from four sites (6%) with a low influence at all sites but one, where it was high. Dumping of rubbish was recorded from six sites (10%) as an impact with low influence. The application of fertiliser, agricultural activities generating soil pollution, use of pest control methods, and the impact of storms were noted at one site each (2%).

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*

8.6 List of main conservation measures	MB04 Adapt/manage reforestation and forest regeneration MB05 Adapt/change forest management and exploitation practices MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species
8.7 Additional information *Optional*	Of the 63 sites surveyed for this reporting period, implemented conservation measures were noted at ten sites (16%). Control of non-native plant species (MI03) was noted to have occurred at six sites (10%). Three of these are within Killarney National Park, two are privately owned and one is a Coillte site. Each of these related to *Rhododendron ponticum* control apart from at the Coillte site where felling of non-native conifers had occurred. In each instance it was noted that additional management was required. A deer fence on a private site in Wicklow had been maintained (MB04) and fencing had been installed at a site in Kerry preventing access by cattle. One site in Cork is understood to be under management through the Native Woodland Scheme. Through this scheme, fencing was erected (MB04) to prevent cattle from accessing the site and felled trees had been retained on the site (MB05). Ongoing deer management (MI03, MI05) was noted at four sites within National Parks. Outside the monitoring network, measures have been taken at several sites supporting 91A0. New deer exclosures have been installed at Vale of Clara Nature Reserve (MB04). At Glengarriff Woods Nature Reserve, a Native Woodland Conservation Scheme has involved the removal of non-native invasive trees and shrubs (MI03) from an area of 4.7 ha to restore 91A0 habitat. Derryclare Nature Reserve has been fenced against sheep (MB04). At Glen of the Downs Nature Reserve, there has been extensive removal of *Prunus laurocerasus* (MI03). So far, this has been predominantly outside of the 91A0 habitat but works are ongoing and will benefit the habitat. Coillte's Dublin Mountains Makeover project that started in 2020 involves felling and replanting an area of over 900 ha across nine Coillte forests (MB04). These stands are transitioning away from primarily wood-producing forests, to forests managed primarily for recreation, biodiversity and climate. Species mixes used in replanting should be conducive to the development of 91A0. A Woodland Management Strategy has been prepared for Glenveagh National Park and a Woodland Management Plan for Ballyconnell Demesne. An ongoing project is developing a similar strategy for the Wicklow Mountains National Park and management plans for five NPWS-owned sites in County Wicklow that support 91A0. The Wicklow Deer Management Project ran from 2019-2022 and had the principal aim of establishing new deer management units in the county and putting deer management on a more professional basis. A report on developing a sustainable deer management strategy for Ireland (DAFM, 2023) lists actions towards establishing sustainable management of deer populations in Ireland, and is in the process of being implemented.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The current range is approximately equal to the FRR and the short-term trend direction of Range is assessed as *stable*. Therefore, the conservation status of Range is *Favourable*. The future trend of range is assessed as overall *stable* as the range is not expected to contract based on the balancing of the threats and conservation measures that are currently in place. The Future prospects of Range are therefore *Good*. The current area is more than 10% below the FRA and the short-term trend direction of Area is assessed as *decreasing*. Therefore, the conservation status of Area is *Unfavourable-Bad*. The future trend of area is assessed as *negative* based on the likelihood of ongoing area losses and the lack of mature woodland conforming to the habitat being created in the next 12 years. The Future prospects of Area are therefore *Bad*. More than 25% of the habitat is not in good condition, although the short-term trend direction of Structure and functions is *stable*. Therefore, the conservation status of Structure and functions is *Unfavourable-Bad*. The future trend of Structure and functions is assessed as *stable*, as overgrazing and invasive species (both high influence pressures) are expected to have a continued negative influence on structure and functions with conservation measures to address these pressures unlikely to be fully implemented across the habitat in the next 12 years. The Future prospects of Structure and functions are therefore *Bad*.	

10 Conclusions	
Assessment of conservation status at end of reporting period	
10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*

10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	See section 9.2 for reasoning for sections 10.1, 10.2, 10.3. As one or more of the parameters in section 9.1 have *Bad* prospects, Future prospects for the habitat are assessed as *Unfavourable-Bad*. As two parameters (Range and Structure and functions) are *stable* but one parameter (Area) is *decreasing*, the overall trend in conservation status is assessed as *deteriorating*.	

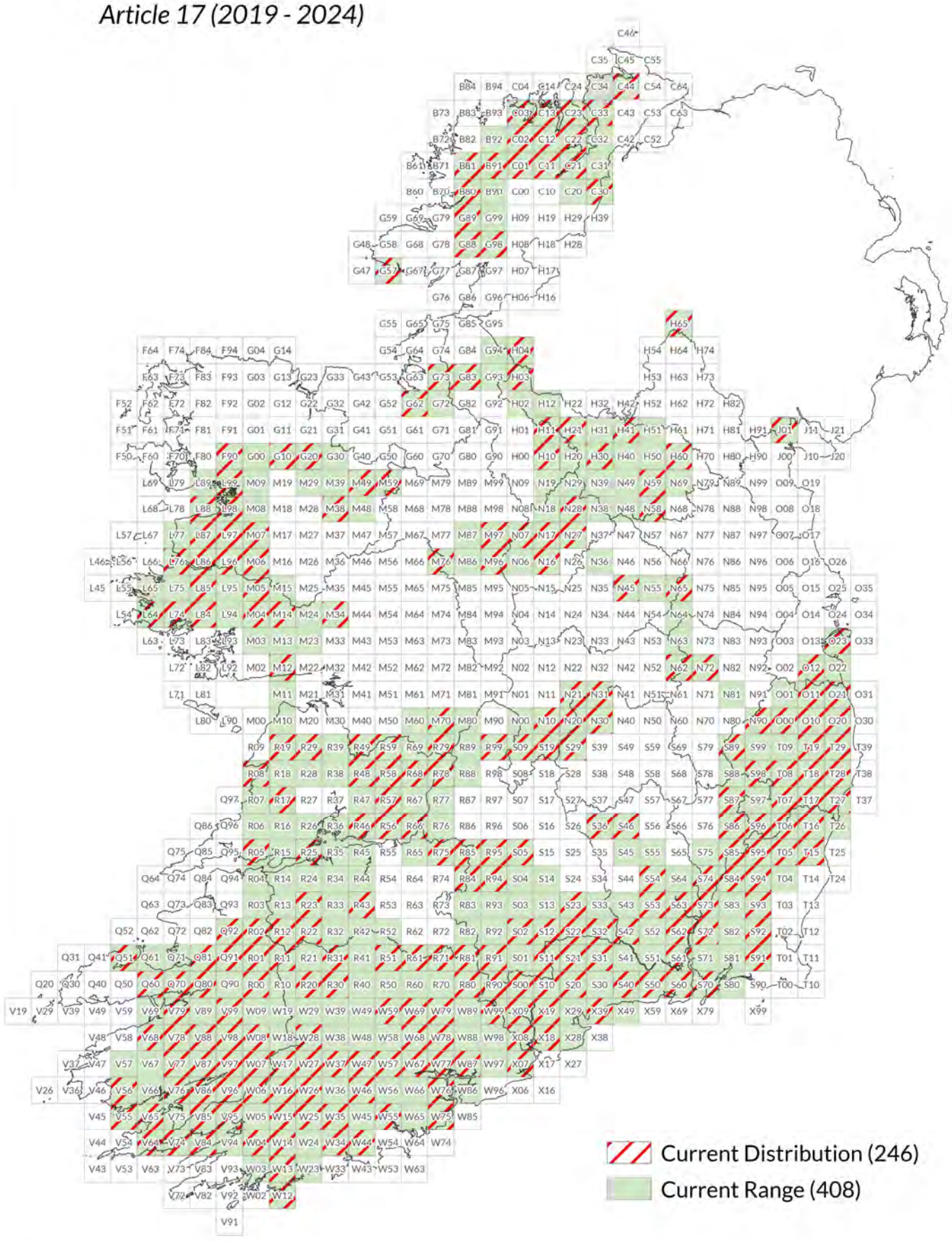
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***33.71 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* *stable / increasing /* ***decreasing*** */ uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data*	

	c) Based mainly on expert opinion with very limited data *d) Insufficient or no data available*
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
11.8 Additional information *Optional*	Area within the SAC network was calculated thus: 33.586 km^2 from polygons + 0.125 km^2 from points, there being five points that do not intersect with any of the polygons and each representing a nominal area of 2.5 ha. In 2013, the surface area of the habitat within the SAC network was reported as 38.99 km^2. In 2019, the reported figure was 39.38 km^2. The decrease since then of 5.67 km^2 is due to the four reasons outlined in section 5.17; of these, genuine loss of woodland is a minor but measurable component. Recorded losses within the SAC network for the current reporting period are 2.46 ha (following method 2, section 5.17). Losses that occurred at sites within both the SAC and monitoring networks totalled 0.45 ha. Given that 238.58 ha of the habitat occurred within both networks at the start of the reporting period, this gives an estimated rate of loss of 0.19%. Extrapolating, using the figure presented in 11.1, gives an estimated loss of 6.36 ha (following method 1, section 5.17). For deducing the area within the SAC network in good condition, monitoring sites were deemed to be within the network if three or four of their monitoring stops were located in an SAC. Of the 63 monitoring sites, there were 33 such sites. Of their total area, 42.3% was deemed in good condition and 57.7% was deemed in not-good condition. Similar data were not presented in previous reports, so the trend is assumed to follow the national trend (section 6.4). It should be noted that the monitoring network does not detect increases in area.

12 Complementary information *N/A*

Old oak woodland (91A0)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**91D0 Bog woodland***
1.2i Habitat short name	**Bog woodland**
1.3i Habitat description	Bog woodland occurs in three distinct habitats in Ireland: on intact raised bogs, where it is associated with low flow flushes on the high bog; on cutover bog, where it occurs in association with a weak groundwater influence; and within sessile oak woodlands in association with nutrient-poor flushes. They are mostly found in the midlands, the mid-west, the drumlin belt of the north midlands and in upland valleys. Bog woodlands are dominated by *Betula pubescens,* with small amounts of willow, mostly *Salix aurita* or *Salix cinerea*. Locally, there may be small amounts of *Pinus sylvestris*, especially on raised bogs. The dwarf shrub and field layers may be poorly to well-developed. Dwarf shrub species can include *Calluna vulgaris*, *Vaccinium myrtillus* and *Vaccinium oxycoccos*. Field layer species can include *Molinia caerulea*, *Juncus effusus* and *Dryopteris* spp. The bryophyte layer has a characteristic luxuriant growth of *Sphagnum* species. *Polytrichum commune* and *Aulacomnium palustre* are also typical. Bog woodlands are closely linked to precise hydrological conditions that are required for both their initiation and maintenance. These conditions are characteristically restricted to small areas, and consequently the area of individual bog woodlands is typically small. The long-term dynamics of bog woodlands is still poorly understood (O'Connell, 1988; O'Connell & Doyle, 1990). Bog woodland on raised bog and within sessile oak woodlands are considered more or less permanent, provided hydrology remains stable, whereas bog woodlands on cutover may represent a more transient community that gradually reverts to raised bog or dries out to become another woodland type (Cross & Lynn, 2013). The Irish Vegetation Classification (IVC; Perrin, 2024) places 91D0 habitat within the WL4 *Betula pubescens – Molinia caerulea* group. Two vegetation communities in this group have an affinity to the Annex I habitat, WL4C *Betula pubescens – Sphagnum palustre* woodland and WL4E *Betula pubescens – Salix cinerea* woodland. WL4C has a strong affinity and WL4E a weak affinity.

2 Maps	
Distribution of the habitat type within the Member State concerned	
2.1 Year or period	***2003-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map produced for the 2007-2012 reporting period (NPWS, 2013) utilised the following sources: Fernandez *et al.* (2005), Fernandez *et al.* (2006), O'Neill *et al.* (2010), Fernandez *et al.* (2014) and polygons digitised in 2013 by the contemporary NPWS Woodlands Expert, Dr John Cross. The distribution map produced for the 2013-2018 reporting period (NPWS, 2019) built on the previous one and utilised the following additional sources: Foss & Crushell (2014), Devaney *et al.* (2017), Daly *et al.* (2023), the Bord na Móna Master Habitat Dataset, the Coillte Biodiversity Dataset (various dates) and a single Bord na Móna point record (Mark McCorry, pers. comm.). The distribution map produced for the 2019-2024 reporting period built on the previous ones and utilised the following additional sources: Perrin *et al.* (in prep. a), O'Neill *et al.* (2023), the National Fen Survey dataset (2021-2023) and two recent NPWS raised bog survey datasets (NPWS 2016-2024). It comprises 63 10x10 km grid cells, up from the 44 cells reported in NPWS (2019) with a new cluster of sites mapped in the southwest of the country. A certainty score with a range of 1-3 had been applied to all data that informed the distribution map in the 2013-2018 reporting period whereby 3 was the highest certainty and 1 the lowest. For this reporting period, a range of 1-4 was used, with a value of 4 being reserved for data from Perrin *et al.* (in prep. a) and the two NPWS raised bog survey datasets, as these specifically mapped habitat 91D0. A value of 2 was applied to records from O'Neill *et al.* (2023) and the National Fen Survey dataset as Annex I woodland was not the focus of those surveys. Certainty values from the datasets utilised during the previous reporting periods were not re-evaluated. All data sources with certainty 1-4 were used to map the distribution of the 91D0 habitat.

BIOGEOGRAPHICAL LEVEL	
Complete for each biogeographical region or marine region concerned	
3 Biogeographical and marine regions	
3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Bord na Móna Master Habitat Dataset. An extract from this dataset was made available by Bord na Móna. Coillte Biodiversity Dataset (various dates) GIS files and individual site management plans were made available by Coillte. Cross, J. & Lynn, D. (2013) Results of a monitoring survey of bog woodland. *Irish Wildlife Manuals*, No. 69. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. DAFM (2023) Irish Deer Management Strategy Group Final Report into Developing a Sustainable Deer Management Strategy for Ireland. Department of Agriculture, Food and the Marine, Dublin. Daly, O.H., O'Neill, F.H. & Barron, S.J. (2023) The monitoring and assessment of four EU Habitats Directive Annex I woodland habitats. *Irish Wildlife Manuals*, No. 146. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Devaney, J., Redmond, J., Barrett, B., Cott, G. & O'Halloran, J. (2017) 21st Century Deforestation in Ireland, EPA Research Report No. 221. Prepared for the Environmental Protection Agency, Johnstown Castle, Co. Wexford. Fernandez, F., Connolly, K., Crowley, W., Denyer, J., Duff, K. & Smith, G. (2014) Raised Bog Monitoring and Assessment Survey 2013. *Irish Wildlife Manuals*, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. Fernandez, F., MacGowan, F., Crowley, W., Farrell, M., Croal, Y., Fanning, M. & McKee, M. (2006) Assessment of the impacts of turf cutting on designated Raised Bogs 2003-2006. Unpublished report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-2005. Unpublished report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. Foss, P.J. & Crushell, P. (2014) County Kildare Wetland Survey III. Part 1: Main Report. Report prepared for Kildare County Council and The Heritage Council. National Fen Survey dataset (2021-2023). Unpublished data from an ongoing NPWS habitat survey project.

	NPWS (2007) The Status of EU Protected Habitats and Species in Ireland. Volume 3. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage, and the Gaeltacht, Dublin. NPWS (2016-2024) Unpublished data from raised bog surveys, with projects codes RARB16 and RBRP20. O'Connell, C.A. & Doyle, G.J. (1990) Local vegetation history of a pine woodland on Clonfinane Bog, County Tipperary. *Ecology and conservation of Irish peatlands* (ed. by G.J. Doyle), pp. 23-40. Royal Irish Academy, Dublin. O'Connell, C.A. (1988) A comparative palynological study of contemporary and subfossil pine and birch woodlands in Irish raised bogs. PhD Thesis, University College Dublin, Dublin. O'Neill, F.H., Martin, J.R. & McNutt, K.E. (2010) The digitisation of woodland habitats surveyed as part of the National Survey of Native Woodlands. Unpublished report submitted to National Parks and Wildlife Service, Dublin. O'Neill, F.H., Perrin, P.M., Denyer, J., Martin, J.R., Brophy, J.T. & Daly, O.H. (2023). Scoping study and pilot survey of fens. *Irish Wildlife Manuals,* No. 143. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Perrin, P.M. (2024) Handbook for the Irish Vegetation Classification. Series No. 38, National Biodiversity Data Centre, Waterford. Perrin, P.M., Barron, S.J., Hamilton, J.J., Woods, K.M.S. & Daly, O.H. (in prep. a) Survey of NPWS woodland properties in the South Western region. *Irish Wildlife Manuals*, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Perrin, P.M. & Barron, S.J. (in prep.) Annex I Woodland Monitoring Survey 2023-2024. *Irish Wildlife Manuals*, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin.

4 Range		
Range within the biogeographical/marine region concerned		
4.1 Surface area	***13,500 km²***	
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	

4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km² or*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.	
4.14 Additional information *Optional*	Range was calculated using the range tool algorithm. As a result of the increase in the distribution detailed in section 2.5, calculated range also increased, up by 4,500 km^2 from the last reporting period. There is no indication that changes in area reported in this or previous reporting periods have resulted in a change of the range in the short-term or long-term trend periods. The Favourable Reference Range (FRR) is deemed to be approximately equal to the current range.	

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2003-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***2.08 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		

<table>
<tr><td>5.10 Short-term trend
Method used</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td>5.11 Long-term trend
Period
Optional</td><td colspan="2">2000-2024</td></tr>
<tr><td>5.12 Long-term trend
Direction
Optional</td><td colspan="2"><u>stable</u> / increasing / decreasing / uncertain / unknown</td></tr>
<tr><td rowspan="3">5.13 Long-term trend
Magnitude
Optional</td><td>a) Minimum</td><td></td></tr>
<tr><td>b) Maximum</td><td></td></tr>
<tr><td>c) Confidence interval</td><td></td></tr>
<tr><td>5.14 Long-term trend
Method used
Optional</td><td colspan="2">Select one of the following methods:
a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) In km² or</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:
☐ <u>approximately equal to the favourable reference area (less than 2% smaller)</u>
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
</table>

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The current area for this habitat is lower than that reported in NPWS (2019), down by 0.05 km^2 from 2.13 km^2. The reasons for this decrease in reported area are twofold. Firstly, there was an improvement in the accuracy of data incorporated from the National Survey of Native Woodlands (O'Neill *et al*., 2010). In NPWS (2013) and NPWS (2019), if habitat 91D0 occurred within a polygon as a component of a mosaic, the entire area of polygon was treated as being habitat 91D0. Percentage data on mosaics from O'Neill *et al.* (2010) have now been used to more accurately reflect the abundance of the habitat. Secondly, recent survey work at Carbury Bog NHA had more accurately mapped the habitat there and found it much rarer than previously thought. However, these decreases have been partly offset by increases. Firstly, some stands that were previously known but omitted have been added to the distribution (e.g., Sheheree Bog and Uragh Wood Nature Reserve). Secondly, some stands which were not previously mapped have been added to the distribution (e.g., Glengarriff Woods Nature Reserve, various sites from the National Fen Survey). For the current reporting period, 12 91D0 sites were surveyed and assessed for loss of area; none was recorded. For the 2013-2018 reporting period, 14 91D0 sites were surveyed and assessed for area loss (NPWS, 2019; Daly *et al.*, 2023). No losses were recorded by that survey either. For the 2007-2012 reporting period, 11 91D0 sites were surveyed and assessed for area loss (NPWS, 2013; Cross & Lynn 2013). Again, no area losses were recorded. However, as reported in NPWS (2019), analysis of the DEFORMAP dataset (Devaney *et al.*, 2017) indicates 1.2 ha of 91D0 loss during this period. The same dataset did not indicate any losses of 91D0 in the 2001-2006 reporting period, but during that time a severe fire on All Saints Bog resulted in the loss of 0.76 ha of 91D0 habitat (Fernandez *et al.*, 2014). NPWS (2013; 2019) highlighted the potential increase in 91D0 area due to development of the habitat on abandoned cutover and cutaway. However, such increases remain largely undocumented and unquantified, so it is not possible to determine whether or not they exceed the aforementioned losses. The short-term and long-term trends have thus been assessed tentatively as *stable*. NPWS (2007) speculated that even before the historical destruction of most of Ireland's raised bogs (habitat 7110), 91D0 on active raised bogs would not have covered more than a few hundred hectares. However, 91D0 also occurs in Ireland as flushed areas within sessile oak woods (habitat 91A0) and given the significant and widespread historical loss of that habitat, such flushes may have composed a significant proportion of the 91D0 historical resource but this has not been estimated. As discussed above, the abundance of 91D0 as a secondary habitat on cutover bog has not been accurately determined. In light of these ambiguities, Favourable Reference Area

	(FRA) is currently set to be the current surface area, but this should be regarded as a minimum estimate.

6 Structure and functions			
6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***1.37 km²***
		Maximum	***1.37 km²***
	b) Area in not-good condition	**Minimum**	***0.71 km²***
		Maximum	***0.71 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	*stable / increasing /* ***decreasing*** */ uncertain/ unknown*		
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/****NO***		
6.7 Typical species Method used *Optional*	The presence of typical species within four 10 m x 10 m plots was recorded for each of the assessment sites. Typical species were assessed by three sub-criteria: (i) the presence of the target species, *Betula pubescens* (ii) the presence of at least one species of *Sphagnum* (from a list of three), (iii) the presence of at least five other positive indicator species (from a list of seventeen). Taxa on the current list of typical species that are used in the typical species assessment by Daly *et al*. (2023) comprise *Betula pubescens* (target species), *Salix aurita, Salix cinerea, Salix* x *multinervis, Dryopteris dilatata, Dryopteris carthusiana, Carex rostrata, Juncus effusus, Molinia caerulea, Calluna vulgaris, Vaccinium oxycoccos, Vaccinium myrtillus, Empetrum nigrum, Epilobium palustre, Potentilla erecta, Polytrichum commune, Sphagnum fimbriatum, Sphagnum*		

	fallax, Sphagnum palustre, Hylocomium splendens and *Aulacomnium palustre*.
6.8 Additional information *Optional*	During the current reporting period, 12 sites were assessed for Structure and functions. At site level, a 'Green' assessment resulted if all plots passed at the individual-plot level and the four-plot level was also passed. One failure out of these five assessments resulted in an 'Amber' assessment. More than one failure resulted in a 'Red' assessment (Perrin & Barron, in prep.). For this reporting period, sites with an 'Amber' or 'Red' assessment were considered to be in need of condition improvement and the site as a whole was assessed as 'not good'. Six sites received a 'Green' (good) assessment with these sites representing 66.0% of the total assessed area. Six sites received an 'Amber' or 'Red' (not good) assessment, with these sites representing 34.0% of the total assessed area. The figures reported in section 6.1 were reached by applying these percentages to the habitat area reported in section 5.2. A similar approach was applied retrospectively to data from previous reporting periods. In 2019, 94.9% of the habitat was good and 5.1% was not good. In 2013, 100.0% was good and 0.0% was not good. The change since the last reporting period is partly explained by the addition of a criterion pertaining to the presence of grazing indicators. Trampling was a particular problem at three of the sites. The peaty substrate and *Sphagnum* carpets or hummocks that are characteristic of this habitat are very vulnerable to disturbance. However, without this criterion the current area in good condition would still only be 87.0%. During the current reporting period, the least frequently passed criteria pertained to the occurrence of *Betula pubescens* trees in different size classes (50.0% of sites passed) and the frequency of *Betula pubescens* saplings (58.3% of sites passed); these low pass rates also contributed to the decline in area in good condition. Consequently, the short-term trend is deemed to be *decreasing*.

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PI04 Plant and animal diseases, pathogens and pests	Ongoing and likely to be in the future	Minority <50%	High
PH04 Vandalism or arson (incl. human-introduced wild fire)	Ongoing and likely to be in the future	Minority <50%	Medium
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	Medium
PI03 Problematic native species	Ongoing	Minority <50%	Low
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	Invasive alien plant species present include *Rhododendron ponticum, Fagus sylvatica, Acer pseudoplatanus* and *Picea sitchensis*. Invasive animal records were all non-native deer, e.g. *Cervus nippon* (Sika Deer).
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Pressures and threats were selected and ranked based on intensity (high, medium or low), frequency of occurrence, and area of impact, using the data gathered during the 2023-2024 Woodland Monitoring Survey as presented in Perrin & Barron (in prep.). Additionally, expert judgement was used when considering impacts not recorded during the Woodland Monitoring Survey but which have resulted in recorded loss of area. Other invasive alien plants (PI03) were recorded from seven of the twelve monitoring sites (58%) with the influence being medium at the majority (four sites) and low at the remainder. Excessive deer browsing was recorded from three sites (25%) with the influence being high at one site and medium at two. This was recorded under PI02 Other invasive alien species (other than species of Union concern). Problematic native plants were recorded from one site (8%) where dense *Pteridium aquilinum* appears to be expanding due to drying out. Ash dieback was recorded from one site (8%), where the influence was considered to be high, but only over a small extent of that site. Drainage (PL02) was recorded from four sites (33%) with a low influence. This is as a result of past peat extraction activities. PH04 Vandalism or arson (incl. human-introduced wild fire) was recorded at two sites (17%) as there was evidence of previous fire within the woodlands with a consequent loss of deadwood.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* *c) Increase the surface area of the habitat type (related to 'Area covered by habitat')* ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/ **improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* ***c) Long-term response (after 2036)***
8.6 List of main conservation measures	MI03 Management, control or eradication of other invasive alien species MK02 Reduce impact of multi-purpose hydrological changes

8.7 Additional information *Optional*	During the survey for this reporting period, of the twelve monitoring sites, conservation measures were noted as having been implemented at three (25%). At two of these sites, All Saints and Clara Bog (Sites 605 and 606), drain blocking measures (MK02) had been undertaken on bog adjoining the woodland sites. Deer culling (MI03) is conducted by NPWS in the Wicklow Mountains National Park and was recorded as a measure for Giant's Cut (Site 786). However, deer impacts remain a problem at this site, as well as two other monitoring sites. A Woodland Management Strategy is being prepared for Wicklow Mountains National Park with the aim of guiding woodland restoration. At sites outside the monitoring network, conservation measures have been undertaken by the EU LIFE The Living Bog project to restore active raised bog (habitat 7110) at several SAC sites that also support habitat 91D0. These measures are likely to indirectly benefit habitat 91D0. These sites comprise: Ardagullion Bog, Carrownagappul Bog, Carrowbehy/Caher Bog, Ferbane Bog, Killyconny Bog and Sharavogue Bog. A report on developing a sustainable deer management strategy for Ireland (DAFM, 2023) lists actions towards establishing sustainable management of deer populations in Ireland. The Wicklow Deer Management Project ran from 2019-2022 and had the principal aim of establishing new deer management units in the county and putting deer management on a more professional basis.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	***Good*** */ Poor / Bad / Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The current range is approximately equal to the FRR and the short-term trend direction of Range is assessed as *stable*. Therefore, the conservation status of Range is *Favourable*. The future trend of Range is assessed as *stable* as the range is not expected to contract based on the balancing of the threats and conservation measures that are currently in place. The Future prospects of Range are therefore *Good*. The current area is equal to the FRA and the short-term trend direction of Area is assessed as *stable*. Therefore, the conservation status of Area is *Favourable*. The future trend of Area is assessed as *stable* based on the likelihood of area losses being counterbalanced by habitat gains. The Future prospects of Area are therefore *Good*. More than 25% of the habitat is not in good condition and the short-term trend direction of Structure and functions is *decreasing*. Therefore, the conservation status of Structure and functions is *Unfavourable-Bad*. The future trend of Structure and functions is assessed as *negative*, as overgrazing is expected to have a continued	

	negative influence on structure and functions with conservation measures to address these pressures unlikely to be fully implemented across the habitat in the next 12 years. The Future prospects of Structure and functions are therefore *Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	*a) No, there is no difference*
	b) yes, due to genuine change	***b) yes, due to genuine change***
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	***d) yes, due to the use of different method***
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
	The change is mainly due to (select only one option): *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */ unknown/ other reasons*	*The change is mainly due to (select only one option):* *genuine change / improved knowledge or more accurate data /* ***the use of a different method*** */unknown/ other reasons*
10.8 Additional information *Optional*	See section 9.2 for reasoning for sections 10.1, 10.2, 10.3. The 'use of a different method' alluded to in section 10.7 refers to the addition of a criterion pertaining to the presence of grazing indicators (see section 6.8).	

	As one or more of the parameters in section 9.1 have *Bad* prospects, Future prospects for the habitat are assessed as *Unfavourable-Bad*. As two parameters (Range and Area) are *stable* but one parameter (Structure and functions) is *decreasing*, the overall trend in conservation status is assessed as *deteriorating*.

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.68 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* *a) stable* *b) increasing* ***c) decreasing*** *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

11.8 Additional information *Optional*	In 2013, the surface area of the habitat within the SAC network was reported as 0.46 km^2. In 2019, the reported figure was 0.43 km^2. The increase since 2013 of 0.22 km^2 is due mainly to the two methodological reasons outlined in section 5.17 rather than a genuine increase in habitat. No losses were reported from the SAC network during the short-term trend period and there are no documented cases of new sites, therefore the short-term trend of habitat area within the network is deemed to be *stable*. When considering only SACs for which 91D0 is a QI, the area covered by the SAC network is 0.32 km^2, so less than half of the SAC resource. For deducing the area within the SAC network in good condition, monitoring sites were deemed to be within the network if three or four of their monitoring stops were located in an SAC. Of the 12 monitoring sites, there were 7 such sites. Of their total area, 71.8% was deemed in good condition and 28.2% was deemed in not-good condition. Similar data were not presented in previous reports, so the trend is assumed to follow the national trend (section 6.4). It should be noted that the monitoring network does not detect increases in area.

12 Complementary information *N/A*

Bog woodland* (91D0)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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NATIONAL LEVEL	
1 General information	
1.1 Member State	**IE**
1.2 Habitat code / name	**91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)***
1.2i Habitat short name	**Alluvial woodland**
1.3i Habitat description	The Interpretation Manual of European Union Habitats (European Commission, 2013) lists three classes of this habitat, all of which occur on heavy soils that are periodically inundated by the rise of water levels. Two of these classes occur in Ireland, of which the most common is that of the riparian forests of *Fraxinus excelsior* and *Alnus glutinosa* (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses. These stands usually occur within the hydrological systems of fast or slow-flowing rivers or streams, but some examples are spring-fed or flush-fed (European Commission, 2013; Rodwell & Dring, 2001). Note, however, that the Annex I habitat 7220 *Petrifying springs is classified separately. The second of these classes that occurs in Ireland is that of gallery forests of tall willows (Salicion albae) that occur alongside lowland river channels and occasionally on river islands, where the tree roots are almost continuously submerged. These very distinctive woodlands are dominated by the willows that are archaeophytes here according to Stace (2019), namely *Salix alba*, *S. triandra*, *S. viminalis* and *S.* × *fragilis.* These are sometimes accompanied by the native *S. cinerea*, but *Alnus glutinosa* is relatively rare. In addition to these two classes, the interpretation of the habitat for Ireland has been broadened to include lakeside wet woodland. These lakeside stands include alder carr (Alnion glutinosae) dominated by *Alnus glutinosa* and willow carr (Salicion cinereae) dominated by *Salix cinerea*. Flooding may occur frequently (annually or more often) or infrequently (at intervals of several years) but the inundation will nonetheless determine the vegetation. The Interpretation Manual (European Commission, 2013) states that all types of 91E0 are periodically flooded but otherwise well-drained and aerated during low water. However, this is not always the case in the wet climate of Ireland and soils may remain waterlogged for most of the year, particularly where the woodland contains springs and flushes or is crossed by small streams. Carr woodland occurs on peaty soils that are permanently waterlogged. A functioning stand of alluvial woodland with a good structure is a multi-layered system, although the individual layers may be less distinct than in oak woods. As described above, the typical canopy species are *Salix* spp., *Fraxinus excelsior* and *Alnus glutinosa*, and one or more of these should comprise the majority of the canopy. *Betula* spp. and *Crataegus monogyna* are frequently found, with other tree species such as *Quercus robur* and *Ulmus glabra* occurring on better drained soils. Native tree species should dominate, with the exception of archaeophyte willows in gallery woodlands. A luxuriant and diverse herb layer is characteristic of all variations of the habitat with typical

	plants including *Phalaris arundinacea*, *Filipendula ulmaria*, *Mentha aquatica*, *Carex remota*, *Lycopus europaeus*, *Iris pseudacorus* and *Urtica dioica*. Vernal species such as *Ficaria verna* and *Anemone nemorosa* may also occur. The bryophyte layer contains robust pleurocarps such as *Thamnobryum alopecurum*, *Climacium dendroides* and *Calliergonella cuspidata*. The Irish Vegetation Classification (IVC; Perrin, 2016) primarily places 91E0 habitat within the WL3 *Alnus glutinosa – Filipendula ulmaria* group. All vegetation communities in this group (WL3A-WL3F) have an affinity to the Annex I habitat.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***1993-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted
2.5 Additional information *Optional*	The distribution map produced for the 2007-2012 reporting period (NPWS, 2013) utilised the following sources: Tubridy (2006), O'Riain *et al.* (2007), Crushell & Foss (2008), O'Donoghue *et al.* (2008), O'Donoghue *et al.* (2009), Wilson (2009), O'Neill *et al.* (2010), Barron & Perrin (2011), Duff & Denyer (2012), NPWS (2012), Roughan & O'Donovan (2012), Coillte Priority Woodland, Carlow Pilot Habitat Mapping, Fingal Habitat Survey, Uplands and Peatlands Grazing Survey, Habitat Assignment Project and polygons digitised in 2012 by the contemporary NPWS Woodlands Expert, Dr John Cross. The distribution map produced for the 2013-2018 reporting period (NPWS, 2019) built on the previous one and utilised the following additional sources: Browne (1998), Lynch (2005), Martin (2006), Maher & Hamilton (2012), Brophy & Devaney (2013), Foss *et al.* (2014), Perrin *et al.* (2014a), Perrin *et al.* (2014b), Brophy & Martin (2015), Daly *et al.* (2015), Foss *et al.* (2015), Martin *et al.* (2015), O'Neill & Martin (2015), Brophy & D'Arcy (2016), Irish Water (2017), Martin & Brophy (2017), Brophy & D'Arcy (2017), Galway County Council (2017), Forest Service (2018), Daly *et al.* (2023) and the Coillte Biodiversity Dataset (various dates). The distribution map produced for the 2019-2024 reporting period was produced in two stages: *Stage 1:* The following additional sources were used to build on the previous maps: Perrin *et al.* (in prep. a), Perrin *et al.* (in prep. b), Forest

	Service (2022), Smith (2019), O'Neill *et al.* (2023) and the National Fen Survey dataset (2021-2023). At this stage, the map comprised 259 hectads, up significantly from the 198 hectads reported in NPWS (2019). A certainty score with a range of 1-3 had been applied to all data that informed the distribution map in the 2013-2018 reporting period, whereby 3 had the highest certainty and 1 the lowest. For this reporting period, a range of 1-4 was used, with a value of 4 being reserved for data from Perrin *et al.* (in prep. a, b) and Smith (2019), recent woodland surveys that specifically mapped habitat 91E0. A value of 2 was applied to records from O'Neill *et al.* (2023) and the National Fen Survey dataset as Annex I woodland was not the focus of those surveys. Certainty values from the datasets utilised during the previous reporting periods were not re-evaluated. All data sources with certainty 1-4 were used to map the distribution of the 91E0 habitat. Some data previously used in determining the distribution are now over 25 years old. These data have been retained but field verification of the occurrence of 91E0 habitat at these sites is recommended for the next reporting period. *Stage 2:* Polygons from the National Landcover Map (Lydon & Smith 2023) classed as 'Broadleaved Forest and Woodland' were intersected with polygons representing alluvial soils from Teagasc's soils and subsoils map (Fealy & Green 2009). Intersecting polygons were retained if they had an extent of at least 400 m^2 or were contiguous with another 91E0 polygon. Polygons created during Stage 2 were assigned a certainty of 1. A union of the resulting data layer and the output from Stage 1 yielded a distribution of 718 hectads. Previous reporting had used a similar approach based on the Forest Inventory Planning System to calculate range as it was deemed data were lacking on smaller stands of the habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Barron, S.J. & Perrin, P.M. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Brophy, J. & Devaney, F. (2013) Ecological Study of the Royal Canal between Talbot Bridge and Maynooth Train Station. Unpublished Report by BEC Consultants Ltd.

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Browne, A. (1998) Vegetation-Environment Interactions in the Vicinity of a Pharmaceutical Plant near Kinsale, Co.Cork. Unpublished Ph.D. Thesis, University College Dublin.

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Fingal Habitat Survey. GIS files for this project were made available by Fingal County Council.

	Forest Service (2018) Ireland's National Forest Inventory 2017 - Results. Department of Agriculture, Food and the Marine. Johnstown Castle, Co. Wexford. Forest Service (2022) Ireland's National Forest Inventory 2022 - Results. Department of Agriculture, Food and the Marine. Johnstown Castle, Co. Wexford. Foss, P.J., Crushell, P. & Kirwan, B. (2015) County Waterford Wetland Survey. Part 1: Main Report. Report prepared for Waterford City and County Council. Foss, P.J., Crushell, P., Kirwan, B., O'Loughlin, B. & Wilson, F. (2014) Louth Wetland Survey III. Report prepared for Louth County Council and The Heritage Council. Galway County Council (2017) Unpublished data collected for the Galway City Transport Project. Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and cNHAs. Irish Water (2017) BRDS 9C Sewer Duplication and Storage Scheme, incorporating Tolka Valley Park Pumping Station. Unpublished Report by Arup. Lydon, K. & Smith, G. (2023) National Landcover Map of Ireland 2018. Final Report. Environmental Protection Agency, Wexford. Lynch, R. (2005) The Vegetation of the Ballyhoura Mountains, Co. Limerick (Woodland relevés). Unpublished Report for the Heritage Council. Maher, C. & Hamilton, J. (2012) Report on the survey and mapping of habitats within Athlone Town. Unpublished report prepared on behalf of Athlone Tidy Towns Committee. Martin, J. (2006) Survey of Rare/Threatened and Scarce Vascular Plants in Counties Cavan, Louth, Meath, Monaghan and Westmeath. Report prepared for National Parks and Wildlife Service, Dublin. Martin, J.R, & Brophy, J.T. (2017) An ecological report on the habitats, mammals, and birds of Maddens Island, River Shannon, Co. Offaly. Unpublished Report by BEC Consultants Ltd. Martin, J. (2006) Survey of Rare/Threatened and Scarce Vascular Plants in Counties Cavan, Louth, Meath, Monaghan and Westmeath. Report prepared for National Parks and Wildlife Service, Dublin. Martin, J.R., O'Neill, F.H & O'Neill, M. (2015) Habitat and Breeding Birds Survey for the Camphire Wetlands, Co. Waterford. Unpublished Report by BEC Consultants Ltd. National Fen Survey dataset (2021-2023). Unpublished data from an ongoing NPWS habitat survey project. NPWS (2012) Management Planning Support Unit Maps 2405_imap95. CPU_Habitats_March_2012.shp NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

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4 Range	
Range within the biogeographical/marine region concerned	
4.1 Surface area	***77,800 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** d) yes, due to the use of different method *e) yes, but nature of change is unknown* *f) yes, due to other reasons*
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*
4.3 Short-term trend Period	***2013-2024***
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*

4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.12 Favourable reference range	*a) In km² or*	
	b) if a precise favourable reference range is unknown Indicate if the range is: ☐ ***approximately equal to the favourable reference range (less than 2% smaller)*** ☐ *between 2% and 10% smaller than the FRR* ☐ *between 11% and 50% smaller than the FRR* ☐ *between 51% and 100% smaller than the FRR*	
	c) Indicate if favourable reference range is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available: high/moderate/low*

	☐ *Reference-based approach*	*Indicate the quality of information available: high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (elaborate in Additional information 4.13)*	
4.13 Range when Directive came into force *Optional*	There is no evidence of loss of range since the Directive came into force.	
4.14 Additional information *Optional*	Range was calculated using the range tool algorithm. Range in the previous reporting period was partly modelled using the Forest Inventory Planning System, whereas in this period the National Landcover Map was instead used. The higher figure reported in this period (up by 16,800 km^2) is mainly due to this improved data source. There is no indication that losses of area reported in this or previous reporting periods have resulted in a contraction of the range in the short-term or long-term trend periods. The Favourable Reference Range (FRR) is deemed to be approximately equal to the current range.	

5 Area covered by habitat

Area covered by the habitat type within the range in the biogeographical/marine region concerned

5.1 Year or period	***1993-2023***	
5.2 Surface area *(in km^2)*	**a) Minimum**	***20.29 km^2***
	b) Maximum	***120.18 km^2***
	c) Best single value	
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* ***b) yes, due to genuine change*** ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*		
5.6 Short-term trend Period	***2013-2024***		
5.7 Short-term trend Direction	*stable / increasing /* ***decreasing*** */ uncertain / unknown*		
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**		
	b) Estimated Maximum		
	c) Pre-defined range	*Where a precise value is not known (5.8 a & b) provide a range. The ranges are provided with a positive or negative sign.* ☐ ***0 – 12%*** ☐ *13 - 25%* ☐ *26 - 50%* ☐ *51 – 100%* ☐ *>100%*	
	d) Unknown		
5.9 Short-term trend Magnitude Type of estimate	*Best estimate / multi-year mean / 95% confidence interval / minimum/* ***pre-defined range***		
5.10 Short-term trend Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
5.11 Long-term trend Period *Optional*	***2000-2024***		
5.12 Long-term trend Direction *Optional*	*stable / increasing /* ***decreasing*** */ uncertain / unknown*		
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**		
	b) Maximum		
	c) Confidence interval		

<table>
<tr><td>5.14 Long-term trend
Method used

Optional</td><td colspan="2">Select one of the following methods:

a) Complete survey or a statistically robust estimate
<u>b) Based mainly on extrapolation from a limited amount of data</u>
c) Based mainly on expert opinion with very limited data
d) Insufficient or no data available</td></tr>
<tr><td rowspan="8">5.15 Favourable reference area</td><td colspan="2">a) 194.5 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference area is unknown Indicate if the area is:

☐ approximately equal to the favourable reference area (less than 2% smaller)
☐ between 2% and 10% smaller than the FRA
☐ between 11% and 25% smaller than the FRA
☐ between 26% and 50% smaller than the FRA
☐ between 51% and 100% smaller than the FRA</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference area is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available:
high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u></td></tr>
<tr><td colspan="2">☐ Other (Elaborate in Additional information 5.17)</td></tr>
<tr><td>5.16 Surface area when Directive came into force

Optional</td><td colspan="2"></td></tr>
<tr><td>5.17 Additional information

Optional</td><td colspan="2">The current minimum area for this habitat is higher than that reported in NPWS (2019), up 0.65 km^2 from 19.64 km^2. The main reason for this increase is the new recording of areas of habitat (i.e. improved knowledge). Such increases have, however, been partially offset, the reasons for this offset being threefold. Firstly, there have been some genuine losses in area as detailed below. Secondly, recent survey work has refined the mapping of the habitat at several sites. Thirdly, and most significantly, the accuracy of data incorporated from the National Survey of Native Woodlands (O'Neill et al., 2010) has been improved. In NPWS (2013) and NPWS (2019), if habitat 91E0 occurred within a polygon as a component of a mosaic, the entire area of polygon was treated as being habitat 91E0. Percentage data on mosaics from O'Neill et al. (2010) have now been used to more accurately reflect the abundance of the habitat.

Minimum area was calculated from the map produced at Stage 1 in section 2.5: 19.212 km^2 from polygons + 1.075 km^2 from points, there</td></tr>
</table>

	being 43 points that do not intersect with those polygons and each representing a nominal area of 2.5 ha. Maximum area was calculated from the map produced at Stage 2 in section 2.5: 19.212 km^2 from standard polygons + 99.921 km^2 from non-overlapping modelled polygons + 1.050 km^2 from points, there being 42 points that do not intersect with any of the polygons and each representing a nominal area of 2.5 ha. The minimum area calculated from the map produced at Stage 1 is substantially smaller than the maximum area calculated from the map produced at Stage 2. This indicates that the minimum area is an underestimate, though it generally has a higher level of certainty than the maximum area. The method used for assessing the short-term and long-term trend of habitat area was therefore categorised as being based mainly on extrapolation from a limited amount of data. Area loss was calculated using two alternative methods. Method 1 extrapolates from data on area losses within the monitoring network. This is a standardised approach but has the potential for underestimation due to the likely highly skewed distribution of area loss data (i.e. most sites have no losses but there are potentially large losses at a small number of sites). Method 2, which is based on total known losses, was therefore used as a safeguard to ensure that area loss is not underestimated. Method 1. Extrapolation from the monitoring network. The 40 91E0 sites in the monitoring network contained 219.72 ha of woodland at the start of the current monitoring period. The 0.85 ha of loss therefore represents 0.39% of that resource. Extrapolating this figure to the national scale (minimum area) yields an estimated loss of 7.85 ha. Method 2. Total known losses. For the current reporting period, 40 sites in a monitoring network for 91E0 were surveyed and assessed for area loss. In total, 0.85 ha of loss was detected across two of the sites through a combination of field observations and satellite imagery analysis. During this analysis, a further 0.91 ha of habitat loss outside the monitoring network was incidentally detected. Total known losses for this period are therefore 1.76 ha, or 0.09% of the national resource (minimum area) at the start of this reporting period. Method 1 is therefore not an underestimate and was used as the estimate of area loss for the current reporting period. For the 2013-2018 reporting period, 40 91E0 sites were surveyed and assessed for area loss (NPWS, 2019; Daly et al., 2023). In total, 1.28 ha of loss was reported across two of the sites. As part of the current assessment, satellite imagery analysis was conducted to confirm these losses. This resulted in the detection of further losses of 0.40 ha across two sites within the monitoring network within that 2013-2018 period. For the 2007-2012 reporting period, 40 91E0 sites were surveyed and assessed for area loss (NPWS, 2013; O'Neill & Barron 2013). A loss of 0.15 ha was reported at a single site. As part of the current assessment, satellite imagery analysis was conducted to confirm this loss. This resulted in the total losses within the network for the 2007-2012 period being re-evaluated as 0.62 ha across three sites. A further 0.91

	ha of habitat loss outside the monitoring network was incidentally detected. Furthermore, as reported in NPWS (2019), analysis of the DEFORMAP dataset (Devaney *et al*., 2017) indicates 2.2 ha of 91E0 loss during this period and a further 0.9 ha of loss in the period 2001-2006. With regards to area gains, initiatives such as the Native Woodland Scheme (NWS) have contributed to the establishment of new wet woodlands in Ireland, but the area of these that qualifies as habitat 91E0 has not yet been assessed. Coillte also manage areas of 91E0 on their estate for biodiversity and have restored 91E0 as part of the Coillte LIFE Project (2006-2009). Some gains in habitat will have occurred from the restoration of wet woodlands, through the selective removal of non-native trees. However, at the vast majority of sites, restoration activities (e.g. invasive species removal, deer control) will have resulted in condition improvement of 91E0, rather than an actual increase in surface area. Although area is higher than reported in the previous period, much of the change is related to improved knowledge. Quantified genuine losses outweigh quantified genuine gains. It is therefore deemed that there has been a net loss in area. 92.6% of the intersect polygons used in Stage 2 in section 2.5 were less than 1 ha in size and they accounted for 52.6% of the total area of those polygons. This means that the maximum area stated in section 5.2b is highly fragmented. With this degree of fragmentation in the current national resource, it might be difficult to maintain long-term viability of the habitat, especially in the face of potential environmental perturbations that could come with climate change. Consequently, Favourable Reference Area (FRA) has been deemed to be higher than current maximum area. The approach used in previous reporting periods (NPWS 2013, 2019) has been retained, with FRA set to 0.25% of the FRR.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***9.46 km²***
		Maximum	***56.02 km²***
	b) Area in not-good condition	**Minimum**	***10.83 km²***
		Maximum	***64.16 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		

6.3 Short-term trend of habitat area in good condition Period	***2013-2024***
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*
6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The presence of typical species within four 20 m × 20 m plots was recorded for each of the assessment sites. Typical species were assessed using three sub-criteria: (i) the presence of at least one target species (*Alnus glutinosa, Fraxinus excelsior, Salix cinerea*, other *Salix* spp.), (ii) the presence of at least six positive species (from a list of 19), (iii) at least four of the positive species noted under (ii) must be species of forbs, graminoids and low woody species (from a subset of 14 species). The last sub-criterion was added for this reporting period. The change was made to address the requirement for diversity in the field layer which is a key characteristic of the habitat. Taxa included on the current list of typical species are as follows: *Alnus glutinosa* (target species), *Fraxinus excelsior* (target species), *Salix cinerea* (target species), *Salix* spp. (target species), *Betula pubescens, Crataegus monogyna, Solanum dulcamara, Viburnum opulus, Agrostis stolonifera, Angelica sylvestris, Carex remota, Filipendula ulmaria, Galium palustre, Iris pseudacorus, Lycopus europaeus, Mentha aquatica, Phalaris arundinacea, Ranunculus repens, Rumex sanguineus, Urtica dioica, Calliergonella cuspidata, Climacium dendroides* and *Thamnobryum alopecurum.*
6.8 Additional information *Optional*	During the current reporting period, 40 sites were assessed for Structure and functions. At site level, a 'Green' assessment resulted if all plots passed at the individual-plot level and the four-plot level was also passed. One failure out of these five assessments resulted in an 'Amber' assessment. More than one failure resulted in a 'Red' assessment (Perrin & Barron, in prep.). For this reporting period, sites with an 'Amber' or 'Red' assessment were considered to be in need of condition improvement and the site as a whole was assessed as 'not good'. Nineteen sites received a 'Green' (good) assessment, with these sites representing 46.6% of the total assessed area. Twenty-one of the sites each received an 'Amber' or 'Red' (not good) assessment, with these sites representing 53.4% of the total assessed area. The figures reported in section 6.1 were reached by applying these percentages to the habitat area reported in section 5.2.

	A similar approach was applied to data from previous reporting periods. In 2019, 47.4% of the habitat was good and 52.6% was not good. In 2013, 62.7% was good and 37.3% was not good. The addition of a new sub-criterion pertaining to the presence of typical field layer species did not impact the current area in good condition. Consequently, the short-term trend is deemed to be *stable*. During the current reporting period, the least frequently passed criteria pertained to the regeneration of non-native trees and shrubs (44.7% of plots passed), the cover of non-native species (71.1% of plots passed) and non-target native tree regeneration (77.5% of plots passed).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PB05 Logging without replanting or natural regrowth	Ongoing and likely to be in the future	Minority <50%	High
PI01 Invasive alien species of Union concern	Ongoing and likely to be in the future	Minority <50%	High
PI04 Plant and animal diseases, pathogens and pests	Ongoing and likely to be in the future	Majority 50-90%	High
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	Medium
PI03 Problematic native species	Ongoing and likely to be in the future	Minority <50%	Medium
PL02 Drainage (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PL05 Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	Minority <50%	Medium
PA10 Livestock farming (without grazing)	Ongoing and likely to be in the future	Minority <50%	Low
PB06 Logging or thinning (excluding clear cutting)	Ongoing and likely to be in the future	Minority <50%	Low
PF03 Creation or development of sports, tourism and leisure infrastructure	Ongoing	Minority <50%	Low
PF05 Sports, tourism and leisure activities	Ongoing and likely to be in the future	Minority <50%	Low
PF06 Deposition and treatment of waste/rubbish from built-up areas	Ongoing and likely to be in the future	Minority <50%	Low

e) Invasive alien species of Union concern	*Impatiens glandulifera* was recorded from four sites (10%) and *Lysichiton americanus* was recorded from one site (2.5%).
f) Other invasive alien species *Optional*	Invasive alien plant species present include *Fagus sylvatica, Acer pseudoplatanus, Aesculus hippocastanum, Rhododendron ponticum, Prunus laurocerasus, Abies alba, Picea sitchensis, Reynoutria japonica* and *Selaginella kraussiana*. For the purposes of categorisation, deer

	are classified as non-native, with the exception of Red Deer (*Cervus elaphus*) within Killarney National Park.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Pressures and threats were selected and ranked based on intensity (high, medium or low), frequency of occurrence, and area of impact, using the data gathered during the 2023-2024 Woodland Monitoring Survey as presented in Perrin & Barron (in prep.). Invasive alien species of Union concern (PI01) were recorded from five sites (12.5%) with *Impatiens glandulifera* recorded from four sites and *Lysichiton americanus* from one site. Other invasive alien plants (PI02) were recorded from 36 sites (90%) with the influence being medium at the majority (20 sites), high at seven sites and low at nine sites. Deer grazing was recorded from seven sites (17.5%), with the influence being high at the majority of these (five sites). This was recorded under PI03 'Problematic native species' for Red Deer (*Cervus elaphus*) within Killarney National Park and under PI02 'Other invasive alien species (other than species of Union concern)' for other instances. Felling without replanting (PB05) resulting in loss of habitat area was recorded at two sites (5%). Thinning (PB06) was recorded at one site. Problematic native plants (PI03) were recorded at four sites (10%). Two of these had excessive *Urtica dioica* cover due to nutrient enrichment from floodwaters. Dense *Rubus fruticosus* agg. and frequent *Carex pendula* tussocks were recorded elsewhere. Ash dieback (PI04) was recorded from 29 sites (72.5%), with the influence noted as high for 15 of these and medium for 12. Drainage (PL02) was recorded from four sites (10%) with a medium influence at each of these. Modification of hydrological flow (PL05) was recorded at three sites (7.5%), with it being a medium influence at two sites and a low influence at the other. All pressures listed above, except PF03 (which is believed to be a one-off instance), are regarded as being the main threats to the habitat.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ ***<50%*** ☐ *50 – 90%* ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* *b) Expand the current range of the habitat type (related to 'Range')* ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* *a) Only inside Natura 2000* ***b) Both inside and outside Natura 2000*** *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* ***b) Medium-term response (within the next two reporting periods, 2025 - 2036)*** *c) Long-term response (after 2036)*
8.6 List of main conservation measures	MB04 Adapt/manage reforestation and forest regeneration MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species

8.7 Additional information *Optional*	Of the 40 sites surveyed for this reporting period, implemented conservation measures were noted at four (10.0%). Two of these relate to ongoing deer management (MI03, MI05) at Townparks, Co. Offaly and Game Wood, Killarney National Park. At Charleville South, Co. Offaly infill planting (MB04) of *Quercus robur* has been conducted within the site. At Hazelwood Demesne, Co. Sligo, a Coillte restoration project has been clearing *Rhododendron ponticum* and *Prunus laurocerasus*. Outside the monitoring network, Dun Laoghaire Rathdown County Council is undertaking invasive species control in 91E0 at Loughlinstown Wood. Woodland Management Plans have been prepared for 91E0 sites at Loughlinstown Wood and Ballyconnell Demesne. A report on developing a sustainable deer management strategy for Ireland (DAFM, 2023) lists actions towards establishing sustainable management of deer populations in Ireland. The Wicklow Deer Management Project ran from 2019-2022 and had the principal aim of establishing new deer management units in the county and putting deer management on a more professional basis. Coillte manage areas of wet woodland on their estate for biodiversity, but data on measures specific to 91E0 are lacking. The Forestry Programme 2023-2027 has introduced a new forest type, FT2 Forests for Water, for which afforestation funding is available. Applications must meet one of the targeted objectives in order to be considered eligible. One of these objectives is expansion of 91E0 habitat.

9 Future prospects

9.1 Future prospects of parameters	**a) Range**	***Good*** */ Poor / Bad / Unknown*
	b) Area	*Good / Poor /* ***Bad*** */ Unknown*
	c) Structure and functions	*Good / Poor /* ***Bad*** */ Unknown*
9.2 Additional information *Optional*	The current range is equal to the FRR and the short-term trend direction of Range is assessed as *stable*. Therefore, the conservation status of Range is *Favourable*. The future trend of Range is assessed as *stable* as the range is not expected to change based on the balancing of the threats and conservation measures that are currently in place. The Future prospects of Range are therefore *Good*. The current area is more than 10% below the FRA and the short-term trend direction of Area is assessed as *decreasing*. Therefore, the conservation status of Area is *Unfavourable-Bad*. The future trend of Area is assessed as *decreasing* based on the likely balance of further area losses against habitat creation in the next 12 years. The Future prospects of Area are therefore *Bad*. More than 25% of the habitat is not in good condition and the short-term trend direction of Structure and functions is *stable*. Therefore, the conservation status of Structure and functions is *Unfavourable-*	

	Bad. The future trend of Structure and functions is assessed as *decreasing*, as ash dieback and invasive species (both high influence pressures) are expected to have a continued negative influence on structure and functions, with conservation measures to address these pressures unlikely to produce net positive results within the next 12 years. The Future prospects of Structure and functions are therefore *Unfavourable-Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	***Favourable (FV)*** */ Inadequate (U1) / Bad (U2) / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) /* ***Bad (U2)*** */ Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving /* ***deteriorating*** */ stable / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	See section 9.2 for reasoning for sections 10.1, 10.2, 10.3 As one or more of the parameters in section 9.1 have *Bad* prospects, Future prospects for the habitat are assessed as *Unfavourable-Bad*. As two parameters (Range and Structure and functions) are *stable* but one parameter (Area) is *decreasing*, the overall trend in conservation status is assessed as *deteriorating*.	

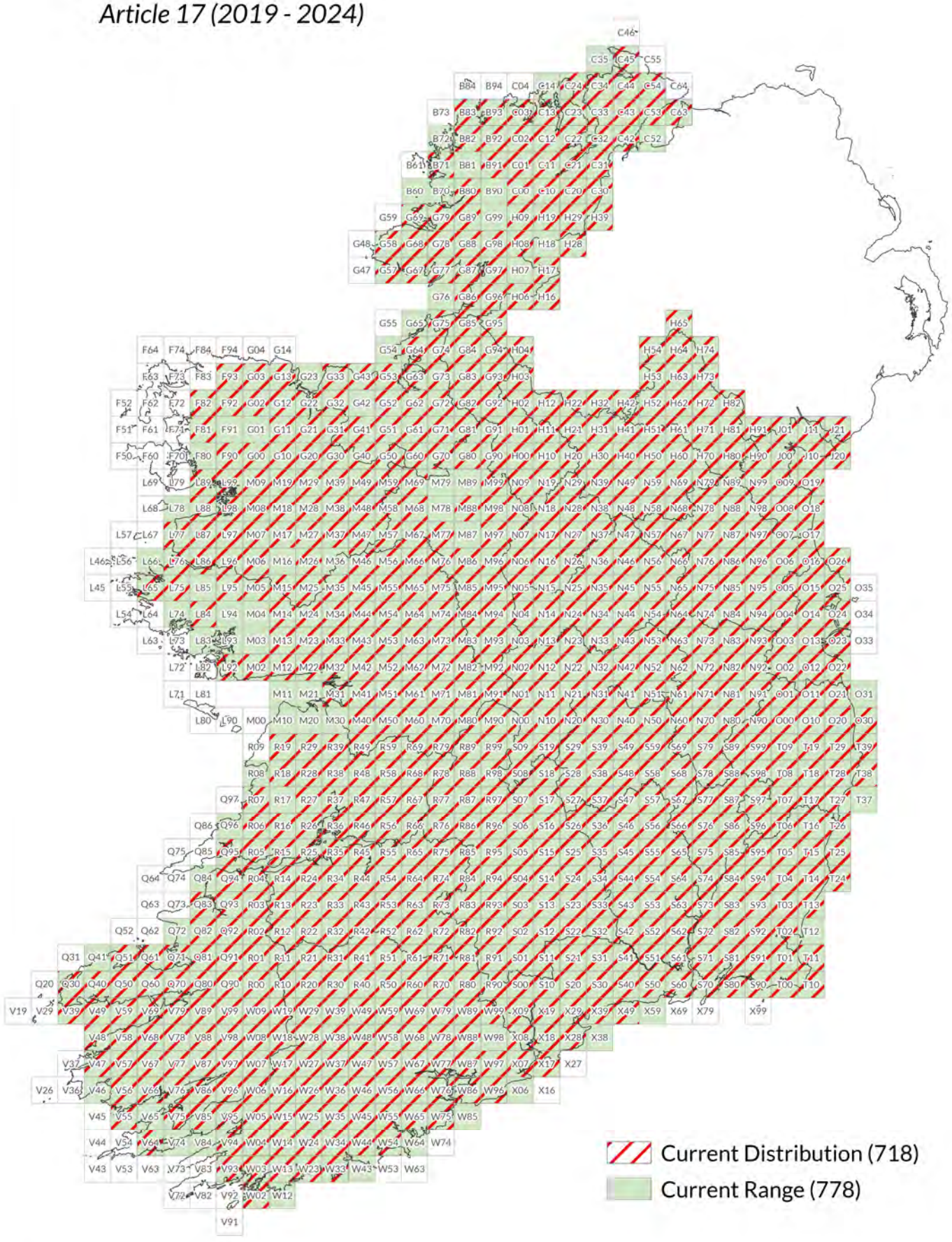
11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	***11.26 km²***
	b) Maximum	***36.99 km²***
	c) Best single value	
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* *a) Complete survey or a statistically robust estimate* ***b) Based mainly on extrapolation from a limited amount of data*** *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Minimum area within the SAC network was calculated from the map produced at Stage 1 in section 2.5: 11.18 km² from polygons + 0.075 km² from points, there being three points that do not intersect with those polygons and each representing a nominal area of 2.5 ha. Maximum area within the SAC network was calculated from the map produced at Stage 2 in section 2.5: 11.18 km² from standard polygons + 25.73 km² from non-overlapping modelled polygons + 0.075 km²	

	from points, there being three points that do not intersect with any of the polygons and each representing a nominal area of 2.5 ha. In 2013, the surface area of the habitat within the SAC network was reported as 10.46 km^2. In 2019, the reported figure was 11.31 km^2. The comparative figure for 2024 is 11.26 km^2. The decrease of 0.05 km^2 is due to the reasons outlined in section 5.17; of these, genuine loss of woodland is a minor but measurable component. None of the habitat area losses reported in section 5.17 occurred within the SAC network, therefore the trend is assessed as *stable*. When considering only SACs for which 91E0 is a QI, the minimum and maximum areas, calculated in a similar fashion, were 8.83 km^2 and 31.08 km^2 respectively. For deducing the area within the SAC network in good condition, monitoring sites were deemed to be within the network if three or four of their monitoring stops were located in an SAC. Of the 40 monitoring sites, there were 18 such sites. Of their total area, 47.9% was deemed in good condition and 52.1% was deemed in not-good condition. Similar data were not presented in previous reports, so the trend is assumed to follow the national trend (section 6.4). It should be noted that the monitoring network does not detect increases in area.

12 Complementary information *N/A*

Alluvial woodland* (91E0)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

0 25 50 km

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V1.0 2025
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NATIONAL LEVEL

1 General information

1.1 Member State	**IE**
1.2 Habitat code / name	**91J0 *Taxus baccata* woods of the British Isles**
1.2i Habitat short name	**Yew woodland***
1.3i Habitat description	Yew woodland is a highly restricted habitat type in Ireland, only occurring at a limited number of sites in the south-west of the country, predominantly on shallow soils over limestone pavement or outcrops. The canopy of this woodland is typically dominated by *Taxus baccata*, with other canopy species including *Fraxinus excelsior* and the introduced *Fagus sylvatica*. *Corylus avellana* and *Ilex aquifolium* are components of the shrub layer, although typically occurring in small quantities. The woodland's dense evergreen canopy can restrict regeneration, which is typically limited or absent. The field layer is characteristically both species-poor and limited in cover, with the most frequent and abundant species being *Hedera helix sensu lato* (which is locally dominant), *Brachypodium sylvaticum, Viola riviniana* and ferns, in particular *Asplenium scolopendrium*. The rocky woodland floor can often support an extensive carpet of bryophytes, dominated by a few robust pleurocarpous mosses including *Thamnobryum alopecurum* and *Isothecium myosuroides*. In east Galway (Kylagowan), Yew woodland with *Quercus petraea* and *Ilex aquifolium* occurs on podzols over acidic tills, and the associated field layer is typical of the Annex I 91A0 woodland habitat. Yew occurs as the dominant species in the sub-canopy within this woodland. Yew is fairly common throughout the woodlands and plantations in the vicinity (Cross & Lynn, 2013b). Within the Irish Vegetation Classification (IVC; Perrin, 2024), 91J0 habitat is strongly related to WL2F *Taxus baccata – Ilex aquifolium* woodland, a community within the WL2 *Fraxinus excelsior – Hedera helix* group.

2 Maps

Distribution of the habitat type within the Member State concerned

2.1 Year or period	***2018-2023***
2.2 Distribution map	Submitted
2.3 Distribution map Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
2.4 Additional maps *Optional*	Range maps were submitted

2.5 Additional information *Optional*	The distribution map produced for the 2007-2012 reporting period (NPWS, 2013) utilised the following sources: Cross & Lynn (2013) and Barron & Perrin (2011). The distribution map produced for the 2013-2018 reporting period (NPWS, 2019) built on the previous one by replacing the data from Cross & Lynn (2013) with data from Daly *et al.* (2023). The distribution map produced for the 2019-2024 reporting period built on the previous ones by adding data for a new 91J0 stand (in Adare Woodlands) from Perrin *et al.* (in prep. a) and replacing all data for the Killarney National Park with that from Perrin *et al.* (in prep. b). It comprises eight 10x10 km grid cells, up from the seven cells reported in NPWS (2019). A certainty score with a range of 1-3 had been applied to all data that informed the distribution map in previous reporting periods, whereby 3 had the highest certainty and 1 the lowest. For this reporting period, a range of 1-4 was used, with a value of 4 being reserved for data from Perrin *et al.* (in prep. a, b) as these recent woodland surveys specifically mapped habitat 91J0. Certainty values from the datasets utilised during the previous reporting periods were not re-evaluated. All data sources with certainty 1-4 were used to map the distribution of the 91J0 habitat.

BIOGEOGRAPHICAL LEVEL

Complete for each biogeographical region or marine region concerned

3 Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	*Choose one of the following:* ***Atlantic**, Marine Atlantic*
3.2 First time reporting	*YES/**NO***
3.3 Additional information	-
3.4 Sources of information	Barron, S.J. & Perrin, P.M. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report submitted to National Parks and Wildlife Service, Dublin. Cross, J. & Lynn, D. (2013) Results of a monitoring survey of yew woodland. *Irish Wildlife Manuals*, No. 72. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. DAFM (2023) Irish Deer Management Strategy Group Final Report into Developing a Sustainable Deer Management Strategy for Ireland. Department of Agriculture, Food and the Marine, Dublin. Daly, O.H., O'Neill, F.H. & Barron, S.J. (2023) The monitoring and assessment of four EU Habitats Directive Annex I woodland habitats. *Irish Wildlife Manuals*, No. 146. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin.

	Devaney, J., Redmond, J., Barrett, B., Cott, G. & O'Halloran, J. (2017) 21st Century Deforestation in Ireland, EPA Research Report No. 221. Prepared for the Environmental Protection Agency, Johnstown Castle, Co. Wexford. NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Perrin, P.M. (2024) Handbook for the Irish Vegetation Classification. Series No. 38, National Biodiversity Data Centre, Waterford. Perrin, P.M. & Barron, S.J. (in prep.) Annex I Woodland Monitoring Survey 2023-2024. *Irish Wildlife Manuals*, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Perrin, P.M., Barron, S.J., Hamilton, J.J., Woods, K.M.S. & Daly, O.H. (in prep. a) Survey of NPWS woodland properties in the South Western region. *Irish Wildlife Manuals*, National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Perrin, P.M., O'Neill, F.H. & Barron, S.J. (in prep. b) Reassessment of selected undesignated woodland sites 2021-2023. *Irish Wildlife Manuals*. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin. Roche, J.R., Perrin, P.M. & O'Neill, F.H. (2023) *Taxus baccata* woods in Ireland: ecology, conservation status and necessary conservation measures, in: Ramil-Rego, P., Guitian, M.A.R., Ferreiro da Costa, J. & Gómez-Orellana, L. (Eds.), *Conservación y Restauración de Los Bosques de Tejo En Europa, Monografías Do Ibader, Serie Biodiversidade*. IBADER, Lugo, pp. 353–371.

4 Range

Range within the biogeographical/marine region concerned	
4.1 Surface area	***800 km²***
4.2 Change and reason for change in surface area of range	*Is there a change between reporting periods?* *(If yes, more than 1 option b) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** d) yes, due to the use of different method *e) yes, but nature of change is unknown* *f) yes, due to other reasons*

	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
4.3 Short-term trend Period	***2013-2024***	
4.4 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.5 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
4.6 Short-term trend Magnitude Type of estimate *Optional*		
4.7 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
4.8 Long-term trend Period *Optional*	***2000-2024***	
4.9 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
4.10 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
4.11 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	

<table>
<tr><td rowspan="7">4.12 Favourable reference range</td><td colspan="2">a) 1,300 km²</td></tr>
<tr><td colspan="2">b) if a precise favourable reference range is unknown Indicate if the range is:
☐ approximately equal to the favourable reference range (less than 2% smaller)
☐ between 2% and 10% smaller than the FRR
☐ between 11% and 50% smaller than the FRR
☐ between 51% and 100% smaller than the FRR</td></tr>
<tr><td colspan="2">c) Indicate if favourable reference range is unknown</td></tr>
<tr><td colspan="2">d) Indicate method used to set reference value (multiple methods can be chosen)</td></tr>
<tr><td>☐ Model-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td>☐ Reference-based approach</td><td>Indicate the quality of information available: high/moderate/low</td></tr>
<tr><td colspan="2">☐ <u>Expert opinion</u>
☐ Other (elaborate in Additional information 4.13)</td></tr>
<tr><td>4.13 Range when Directive came into force
Optional</td><td colspan="2">There is no evidence of loss of range since the Directive came into force.</td></tr>
<tr><td>4.14 Additional information
Optional</td><td colspan="2">Range was calculated using the range tool algorithm. The algorithm included 10x10 km grid cells M50 and M60 due to their location between grid cells containing 91J0. However, M50 and M60 are not known to contain 91J0 or suitable habitat for 91J0 development. These grid cells were deleted, based on expert judgement, to reflect the disjunct distribution of 91J0 in Ireland.

The higher range figure reported in this period (up 100 km^2 from 700 km^2) is due to the addition of a new stand (Adare Woodlands). No actual changes in range have been reported in this or previous reporting periods, therefore Range is assessed as stable in both the short-term and long-term trend periods.

Following the approach of NPWS (2013, 2019), the Favourable Reference Range (FRR) comprises the current range plus five additional 10x10 km grid cells. These additional grid cells have suitable habitat (limestone pavement) with scattered trees and/or small stands of Yew that have the potential to develop into 91J0 habitat (e.g., Rockforest Wood). Three grid cells are on the eastern edge of the Burren. The remaining two grid cells are on the Mayo/Galway border between Lough Mask and Lough Corrib. Coillte planted additional Yew trees at three sites within the additional grid cells (Roche et al., 2023).</td></tr>
</table>

5 Area covered by habitat		
Area covered by the habitat type within the range in the biogeographical/marine region concerned		
5.1 Year or period	***2018-2023***	
5.2 Surface area *(in km²)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.84 km²***
5.3 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
5.4 Surface area Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.5 Change and reason for change in surface area	*Is there a change between reporting periods?* *(If yes, more than 1 option a) to f) can be chosen)* *a) no, there is no change* *b) yes, due to genuine change* ***c) yes, due to improved knowledge/more accurate data*** *d) yes, due to the use of different method* *e) yes, but nature of change is unknown* *f) yes, due to other reasons*	
	The change is mainly due to (select one of the reasons below): *a) genuine change* ***b) improved knowledge or more accurate data*** *c) the use of a different method* *d) unknown* *e) other reasons*	
5.6 Short-term trend Period	***2013-2024***	
5.7 Short-term trend Direction	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.8 Short-term trend Magnitude *Optional*	**a) Estimated Minimum**	
	b) Estimated Maximum	
	c) Pre-defined range	
	d) Unknown	
5.9 Short-term trend Magnitude Type of estimate		

5.10 Short-term trend Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.11 Long-term trend Period *Optional*	***2000-2024***	
5.12 Long-term trend Direction *Optional*	***stable*** */ increasing / decreasing / uncertain / unknown*	
5.13 Long-term trend Magnitude *Optional*	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
5.14 Long-term trend Method used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
5.15 Favourable reference area	***a) 1.33 km²***	
	b) if a precise favourable reference area is unknown Indicate if the area is: ☐ *approximately equal to the favourable reference area (less than 2% smaller)* ☐ *between 2% and 10% smaller than the FRA* ☐ *between 11% and 25% smaller than the FRA* ☐ *between 26% and 50% smaller than the FRA* ☐ *between 51% and 100% smaller than the FRA*	
	c) Indicate if favourable reference area is unknown	
	d) Indicate method used to set reference value (multiple methods can be chosen)	
	☐ *Model-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ *Reference-based approach*	*Indicate the quality of information available:* *high/moderate/low*
	☐ ***Expert opinion***	
	☐ *Other (Elaborate in Additional information 5.17)*	

5.16 Surface area when Directive came into force *Optional*	
5.17 Additional information *Optional*	The current area for this habitat is marginally higher than that reported in NPWS (2019), up 0.01 km^2 from 0.83 km^2. The reasons for an increase in reported area are twofold. Firstly, a new stand has been recently mapped. Secondly, the mapping of the largest 91J0 site, Reenadinna Wood, has recently been revised. For the current reporting period, six 91J0 sites were surveyed and assessed for loss of area; none was recorded. For the 2007-2012 and 2013-2018 reporting periods, six 91J0 sites were surveyed and assessed for area loss (NPWS, 2013, 2019; Cross & Lynn, 2013; Daly *et al.*, 2023). No losses were recorded by those surveys. Analysis of data from Devaney *et al.* (2017) did not indicate any loss of area. NPWS (2019) set a Favourable Reference Area (FRA) of 1.32 km^2, calculated by adding 0.49 km^2 to the then current area (0.83 km^2). This figure of 0.49 km^2 comprised a nominal 0.09 km^2 for potential habitat in the Burren and 0.4 km^2 for potential habitat on ecologically appropriate parts of the Coillte Estate where additional Yew trees were planted. This approach has been retained. To account for the slight increase in reported area, the FRA has been updated to 1.33 km^2. Perrin *et al.* (in prep. b) reported that there may be potential for the development of approximately 1 ha of 91J0 at Stradbally Hills pNHA, which should be investigated further.

6 Structure and functions

6.1 Condition of habitat	**a) Area in good condition**	**Minimum**	***0.07 km²***
		Maximum	***0.07 km²***
	b) Area in not-good condition	**Minimum**	***0.77 km²***
		Maximum	***0.77 km²***
	c) Area where condition is not known	**Minimum**	***0 km²***
		Maximum	***0 km²***
6.2 Condition of habitat Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*		
6.3 Short-term trend of habitat area in good condition Period	***2013-2024***		
6.4 Short-term trend of habitat area in good condition Direction	***stable*** */ increasing / decreasing / uncertain/ unknown*		

6.5 Short-term trend of habitat area in good condition Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
6.6 Typical species	*Has the list of typical species changed in comparison to the previous reporting period? YES/**NO***
6.7 Typical species Method used *Optional*	The presence of typical species within four 20 m × 20 m plots was recorded for each of the assessment sites. Typical species were assessed by three sub-criteria: (i) the presence of the target species, *Taxus baccata*, (ii) the presence of at least six other positive indicator species (from a list of 17), (iii) at least two of the positive species noted under (ii) must be non-bryophyte species (from a subset of 11 species). The last sub-criterion was added for this reporting period. Taxa included on the current list of typical species are as follows: *Taxus baccata* (target species), *Fraxinus excelsior, Quercus robur, Corylus avellana, Ilex aquifolium, Sorbus aucuparia, Lonicera periclymenum, Carex flacca, Brachypodium sylvaticum, Asplenium scolopendrium, Potentilla sterilis, Viola reichenbachiana/Viola riviniana, Metzgeria furcata, Isothecium myosuroides, Thamnobryum alopecurum, Fissidens dubius, Neckera complanata* and *Neckera crispa*.
6.8 Additional information *Optional*	During the current reporting period, six sites were assessed for Structure and functions. At site level, a 'Green' assessment resulted if all plots passed at the individual-plot level and the four-plot level was also passed. One failure out of these five assessments resulted in an 'Amber' assessment. More than one failure resulted in a 'Red' assessment (Perrin & Barron, in prep.). For this reporting period, sites with an 'Amber' or 'Red' assessment were considered to be in need of condition improvement and the site as a whole was assessed as 'not good'. One site received a 'Green' (good) assessment, with this site representing 8.3% of the total assessed area. Five sites each received a 'Red' (not good) assessment, with these sites representing 91.7% of the total assessed area. The figures reported in section 6.1 were reached by applying these percentages to habitat area reported in section 5.2. A similar approach was applied to data from previous reporting periods. In 2019, 8.9% of the habitat was good and 91.1% was not good. In 2013, 10.0% was good and 90.0% was not good. The differences over time are minor therefore the trend is deemed to be essentially *stable* at this time. During the current reporting period, the least frequently passed criteria pertained to indicators of grazing and the height of the field layer (both had a 62.5% pass rate) and the regeneration of non-native trees and shrubs (33.3% pass rate).

7 Main pressures and threats

7.1 Characterisation of pressures/threats

a) Pressure	b) Timing	c) Scope	d) Influence
PI02 Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Majority 50-90%	High
PI03 Problematic native species	Ongoing and likely to be in the future	Majority 50-90%	High
PI04 Plant and animal diseases, pathogens and pests	Ongoing and likely to be in the future	Majority 50-90%	Medium

e) Invasive alien species of Union concern	N/A
f) Other invasive alien species *Optional*	Invasive alien plant species present include *Fagus sylvatica, Acer pseudoplatanus, Rhododendron ponticum, Prunus laurocerasus, Prunus lusitanica* and *Cotoneaster* sp. For the purposes of categorisation deer are classified as non-native, with the exception of Red Deer (*Cervus elaphus*) within Killarney National Park.
7.2 Methods used *Optional*	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*
7.3 Sources of information *Optional*	-
7.4 Additional information *Optional*	Pressures and threats were selected and ranked based on intensity (high, medium or low), frequency of occurrence, and area of impact, using the data gathered during the 2023-2024 Woodland Monitoring Survey as presented in Perrin & Barron (in prep.). High levels of grazing by deer were recorded from three of the six monitoring sites (50%). This was recorded as PI03 'Problematic native species' for Red Deer within Killarney National Park and under PI02 'Other invasive alien species (other than species of Union concern)' for other instances. Invasive plant species (PI02) were recorded from all monitoring sites (100%). The influence was high at two of these sites, medium at two sites and low at two sites. Ash dieback (PI04) was recorded from four of the monitoring sites (67%), with the influence being medium at three of these and high at one site.

8 Conservation measures	
8.1 Status of measures	*Are measures needed? (**YES**/NO)* *If yes, indicate the status of measures:* *a) Measures identified, but none yet taken* *b) Measures needed but cannot be identified* ***c) Part of measures identified have been taken*** *d) Most/all of measures identified have been taken*
8.2 Scope of measures taken	*Fill if c) Part of measures identified have been taken or d) Most/all of measures identified have been taken (8.1) was selected:* *Do these impact:* ☐ *<50%* ☐ ***50 – 90%*** ☐ *>90%* *of the area*
8.3 Main purpose of the measures taken	*A. Indicate the main purpose(s) of measures taken:* *a) Maintain the current range, surface area or structure and functions of the habitat type* ***b) Expand the current range of the habitat type (related to 'Range')*** ***c) Increase the surface area of the habitat type (related to 'Area covered by habitat')*** ***d) Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')***
	B. Where more than one option is selected above, indicate the main (primary) purpose (i.e. select only one option): *Maintain current state / expand range / increase habitat area/* ***improve habitat condition***
8.4 Location of the measures taken	*Indicate the location of measures taken (indicate only one option):* ***a) Only inside Natura 2000*** *b) Both inside and outside Natura 2000* *c) Only outside Natura 2000*
8.5 Response to the measures *(when the measures starts to neutralize the pressure(s) and produce positive effects)*	*Indicate the time frame of the response to measures (with regard to the main purpose indicated in field 8.3) – (indicate only one option):* *a) Short-term response (within the current reporting period, 2019 - 2024)* *b) Medium-term response (within the next two reporting periods, 2025 - 2036)* ***c) Long-term response (after 2036)***
8.6 List of main conservation measures	MI03 Management, control or eradication of other invasive alien species MI05 Management of problematic native species MB05 Adapt/change forest management and exploitation practices

8.7 Additional information *Optional*	Roche *et al*. (2023) identifies necessary conservation measures for five sites within the monitoring network (i.e. sites for which 91J0 is a qualifying interest of the relevant SAC) and reports on conservation measures previously implemented at each of those sites and elsewhere. During the survey for this reporting period, of the six monitoring sites, implemented conservation measures were noted at one site. At Reenadinna, in Killarney National Park the removal of non-functioning deer-fences had been conducted and smaller areas had been temporarily fenced (MB05). Also, control of deer (MI03 and MI05) had been conducted at this site, with 254 deer being culled during 2023. Control of *Rhododendron ponticum* had been conducted (MI03) within Reenadinna and removal of invasive species had also been conducted within Killarney National Park at a 91J0 woodland (Monk's Wood) which is outside the monitoring network. A report on developing a sustainable deer management strategy for Ireland (DAFM, 2023) lists actions towards establishing sustainable management of deer populations in Ireland. In the Burren National Park, a 0.2 ha area of 8240 Limestone pavement with numerous juvenile Yew trees has good potential for 91J0 re-establishment. Under the Rockforest Wood Management Plan, this area has been fenced and is being monitored, with the objective of promoting 91J0 development.

9 Future prospects		
9.1 Future prospects of parameters	**a) Range**	*Good / Poor / **Bad** / Unknown*
	b) Area	*Good / Poor / **Bad** / Unknown*
	c) Structure and functions	*Good / Poor / **Bad** / Unknown*
9.2 Additional information *Optional*	The current range is more than 10% below the FRR, although the short-term trend direction of Range is assessed as *stable*. Therefore, the conservation status of Range is *Unfavourable-Bad*. The future trend of Range is assessed as *stable* as the range is not expected to change in the next 12 years based on the balancing of the threats and conservation measures that are currently in place. The Future prospects of Range are therefore *Unfavourable-Bad*. The current area is more than 10% below the FRA, although the short-term trend direction of Area is assessed as *stable*. Therefore, the conservation status of Area is *Unfavourable-Bad*. The future trend of Area is assessed as *stable* based on the unlikelihood of any area losses and the predicted lack of mature woodland conforming to the habitat being created in the next 12 years. The Future prospects of Area are therefore *Unfavourable-Bad*. More than 25% of the habitat is not in good condition, although the short-term trend direction of Structure and functions is *stable*. Therefore, the conservation status of Structure and functions is *Unfavourable-Bad*. The future trend of Structure and functions is assessed as *stable*, as overgrazing and invasive species (both high	

	influence pressures) are expected to have a continued negative influence on structure and functions. Conservation measures to address these pressures are in place in the Killarney National Park where the majority of the habitat occurs, but these measures need to be expanded to a wider scale and intensified. *Taxus baccata* is a slow-growing, survival-oriented species that does not respond quickly to changes in grazing or competition. Therefore, it is unlikely the status of Structure and functions will change within the next 12 years. The Future prospects of Structure and functions are therefore *Unfavourable-Bad*.

10 Conclusions

Assessment of conservation status at end of reporting period

10.1 Range	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.2 Area	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.3 Specific structure and functions (incl. typical species)	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.4 Future prospects	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.5 Overall assessment of Conservation Status	*Favourable (FV) / Inadequate (U1) / **Bad (U2)** / Unknown (XX)*	
10.6 Overall trend in Conservation Status	*Indicate the trend (qualifier) for FV, U1 and U2:* *improving / deteriorating / **stable** / unknown*	
10.7 Change and reasons for change in conservation status and conservation status trend	*Indicate whether there is a change from the previous reporting round and (if yes) the nature of that change. More than one option (a to f) can be chosen.*	
	Overall assessment of conservation status (10.5)	***Overall trend in conservation status (10.6)***
	a) No, there is no difference	***a) No, there is no difference***
	b) yes, due to genuine change	*b) yes, due to genuine change*
	c) yes, due to improved knowledge/more accurate data	*c) yes, due to improved knowledge/more accurate data*
	d) yes, due to the use of different method	*d) yes, due to the use of different method*
	e) yes, but nature of change is unknown	*e) yes, but nature of change is unknown*
	f) yes, due to other reasons	*f) yes, due to other reasons*
10.8 Additional information *Optional*	See section 9.2 for reasoning for sections 10.1, 10.2, 10.3. As one or more of the parameters in section 9.1 have *Bad* prospects, Future prospects for the habitat are assessed as *Unfavourable-Bad*. As all three parameters are *stable*, the overall trend in conservation status is assessed as *stable*.	

11 Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types		
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network *(In km² in biogeographical/ marine region including all sites where the habitat is present)*	**a) Minimum**	
	b) Maximum	
	c) Best single value	***0.84 km²***
11.2 Type of estimate	***Best estimate*** */ 95% confidence interval / minimum*	
11.3 Surface area of the habitat type inside the network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.4 Short-term trend of habitat area within the network Direction	*Short-term trend of habitat area within the network over the period indicated in the field 5.6. Select one of the following:* ***stable*** */ increasing / decreasing / uncertain/ unknown*	
11.5 Short-term trend of habitat area within network Method used	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.6 Short-term trend of habitat area in good condition within the network **Direction**	*Short-term trend of habitat area in good condition within the network over the period indicated in the field 6.3. Select one of the following:* ***a) stable*** *b) increasing* *c) decreasing* *d) uncertain* *e) unknown*	
11.7 Short-term trend of habitat area in good condition within network **Method used**	*Select one of the following methods:* ***a) Complete survey or a statistically robust estimate*** *b) Based mainly on extrapolation from a limited amount of data* *c) Based mainly on expert opinion with very limited data* *d) Insufficient or no data available*	
11.8 Additional information *Optional*	Almost all of the mapped area for this habitat lies within the SAC network, therefore, the short-term trend for habitat area within the network follows the national trend (section 5.7). When considering only SACs for which 91J0 is a QI, the area covered by the SAC network is 0.81 km².	

	For deducing the area within the SAC network in good condition, monitoring sites were deemed to be within the network if three or four of their monitoring stops were located in an SAC. All of the six monitoring sites were deemed to be within SACs. Therefore, the short-term trend of area in good condition within the SAC network is assumed to follow the national trend (section 6.4). It should be noted that the monitoring network does not detect increases in area.

12 Complementary information *N/A*

Yew woodland* (91J0)

Article 17 (2019 - 2024)



NPWS
An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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OVERVIEW

Every six years, Member States of the European Union are required to report on the conservation status of all habitats and species listed on the annexes of the Habitats Directive. This volume presents the detailed assessments for 59 habitats listed on the Directive that occur in Ireland.

The conservation status assessment uses a format agreed at a European level. For background information on how these assessments were derived please visit:

http://cdr.eionet.europa.eu/help/habitats_art17.

National Parks and Wildlife Service

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COVER IMAGE
Lough Forbes North: Bord na Móna

Rialtas na hÉireann
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