The Status of EU Protected **Habitats and Species** in Ireland 2013

Habitat Assessments

Volume 2

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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Cloonee Loughs, Kenmare River and Iveragh Peninsula from Derrylough, Beara Peninsula, Edwin Wymer

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Contents

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. The conservation status assessment uses a format agreed at a European level. For background information on how these assessments were derived please visit:

http://bd.eionet.europa.eu/article17/reference_portal.

A Notes form is also included to provide more detail on elements of each assessment.

Habitat assessments

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1110

NAME: Sandbanks which are slightly covered by sea water all the time

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2006-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published

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 & Wildlife Service. 32pp

Aqua-Fact International Services Ltd. (2008). Analysis of samples from the Hempton's Turbot Bank. A report to National Parks & Wildlife Service. 8pp

Aqua-Fact International Services Ltd. (2012). Subtidal Benthic Investigations of the Greater Codling Bank. A report to National Parks & 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 & Wildlife Service. 42pp

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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.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	2800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	2800
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	247		
2.4.2 Year or period	1989-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	247
	operator	N/A
	unknown	No
	method	The current Area is considered to be the baseline value. The FRA has been adjusted to the current Area as there is no evidence of a decline since the Directive came into force and it is likely to be adequate to ensure the long term viability of the habitat.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
underground/submerged electricity and phone lines (D02.01.02)	medium importance (M)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
wind energy production (C03.03)	medium importance (M)	N/A
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
underground/submerged electricity and phone lines (D02.01.02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Bathyporeia elegans
Polygordus lacteus
Saccorcirrus papillocercus
Pisione remota
Nephtys cirrosa
Magelona mirabilis
Eumida bahusiensis
Nephtys longosetosa
Spiophanes bombyx
Donax vittatus
Glycera lapidum
Urothoe brevicornis
Pontocrates altamarinus
Fabulina fabula

2.7.2 Species method used	Surveys of Irish sand banks used grab-sampling with subsequent macrofaunal identification complemented with granulometric analysis. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	106 km2 of the resource is listed as a Qualifying Interest within the SAC network

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Favourable (FV)
	qualifiers	N/A
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status		Favourable (FV)
2.8.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	181	max	181
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	increase (+)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative	high importance (H)	Inside	Maintain Enhance Long term Unknown
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Maintain Long term Unknown
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Inside	Maintain Long term Unknown

Field label	Note
Habitat code: 1110	
0.2 Habitat code	Sandbanks in Irish waters comprise distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) that may arise from horizontal or sloping plains of sediment that ranges from gravel to fine sand. They are primarily composed of sandy sediments permanently covered by water, at depths of less than 20 m below chart datum (though the banks may extend to water depths greater than 20 m). 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" 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 with 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. These were originally identified through Admiralty Charts and this has been supplemented by more recent seabed mapping. 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, Hempton's Turbot Bank (Aqua-Fact, 2008) and surveys over areas not conforming to the morphotype, notably Greater Codling Bank. Sandbank habitats in Irish waters were predominantly composed of a fine sand to 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, Saccorcirrus 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 Sandbanks. The species found tend to be ones adapted to mobile substrates but all of the noted species recorded in Irish waters are frequently found in similar shallow coastal sediment habitats. There is some indication that mobile predators such as birds and marine mammals aggregate around Sandbanks but it is not known if this is a function of the features themselves or the accessibility of shallow water.

Field label	Note
Habitat code: 1110	
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed ETRS 1989 LAEA GCS.
1.1.02 Method used - map	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 20m 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 20m 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 15 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.
1.1.03 Year or period	2006 to 2012
1.1.05 Range map	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x 10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.02 Method used - Range	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x 10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	There has been no change in range of Sandbank habitat between 2006 and 2012 reporting periods.
2.3.10 c) Reason for change - use of different method	although there has been no change to the Range calculation between reporting periods the method used to generate this estimate is improved.
2.4.01 Surface area	247 km2 was calculated from polygon shapefiles drawn to align with the 20m contour of Sandbank habitats using a combination of expert judgement and existing mapping data such as UK Home Office Admiralty Charts.
2.4.03 Method used - Area covered by habitat	The area was calculated from polygon shapefiles drawn to align with the 20m contour of Sandbank habitats using a combination of expert judgement and existing mapping data.
2.4.04 Short-term trend - Period	The default trend period was used.

Field label	Note
Habitat code: 1110	
2.4.05 Short-term trend - Trend direction	There is no evidence of a significant loss to the area of this habitat feature in Ireland.
2.4.13 a) Reason for change - genuine change?	The data available in this round of reporting is a significant improvement on that available during the last round of reporting.
2.4.13 c) Reason for change - use of different method	The increase in Sandbank habitat between 2006 and 2012 reporting periods should not be interpreted as an increase in habitat area. The Area reported in 2007 was calculated as 211 km2 and in 2013 this figure is 247 km2. The latter figure is more accurate based on a different definition of habitat (2007 excluded areas less than 10m in depth). The currently calculated figure may be improved by more accurate sea bed mapping based on acoustic surveys although it is not clear if the current technology can fully map the feature due to the risks of using vessels in shallow water.
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.7.02 Typical species - method used	Surveys of Irish Sandbanks used grab-sampling with subsequent macrofaunal identification complemented with granulometric analysis. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis.

Field label	Note
Habitat code: 1110	
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. The significant data collection exercise within Annex I marine habitats within this current reporting cycle has allowed an informed adjudication to be made concerning Sandbank habitat. These data given the extensive spatial coverage of the national resource are capable of indentifying compromised habitat quality. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged "Favourable", any combination below a threshold of 25% of the resource should be judged "Unfavourable – Inadequate", and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are "Unfavourable – Bad".
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The structure and function of this habitat is judged to be Favourable because there is no evidence of a significant effect related to those pressures on the structure and function of the feature. A number of surveys have been undertaken over sandbank habitat in the last 10 years and these have not indicated evidence of lasting or significant damage. There is no evidence of water quality issues associated with this habitat from EPA WFD monitoring or from organic carbon concentrations obtained through benthic sampling. In all of those surveys the species found were indicative of coastal tide swept substrates. Crowe et al. (2011) indicates that sediment communities of this nature have a high degree of tolerance and are probably quite resilient to a dynamic environment which could include some of the anthropogenic pressures indicated.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Not applicable because the Structure and Function is judged favourable
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Sandbank Annex I habitat was judged to be good. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Not applicable because the Future Prospects are judged favourable
2.8.05 Overall assessment of Conservation Status	Since there are four Favourable results in Range, Area, and Future Prospects the overall conclusion is the habitat is currently "Favourable".
2.8.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the condition of this habitat in the future.
3.1.01 a) Surface area - Minimum	181 km2 of the national resource of Sandbanks which are slightly covered by seawater at all times (1110) is currently within the network.

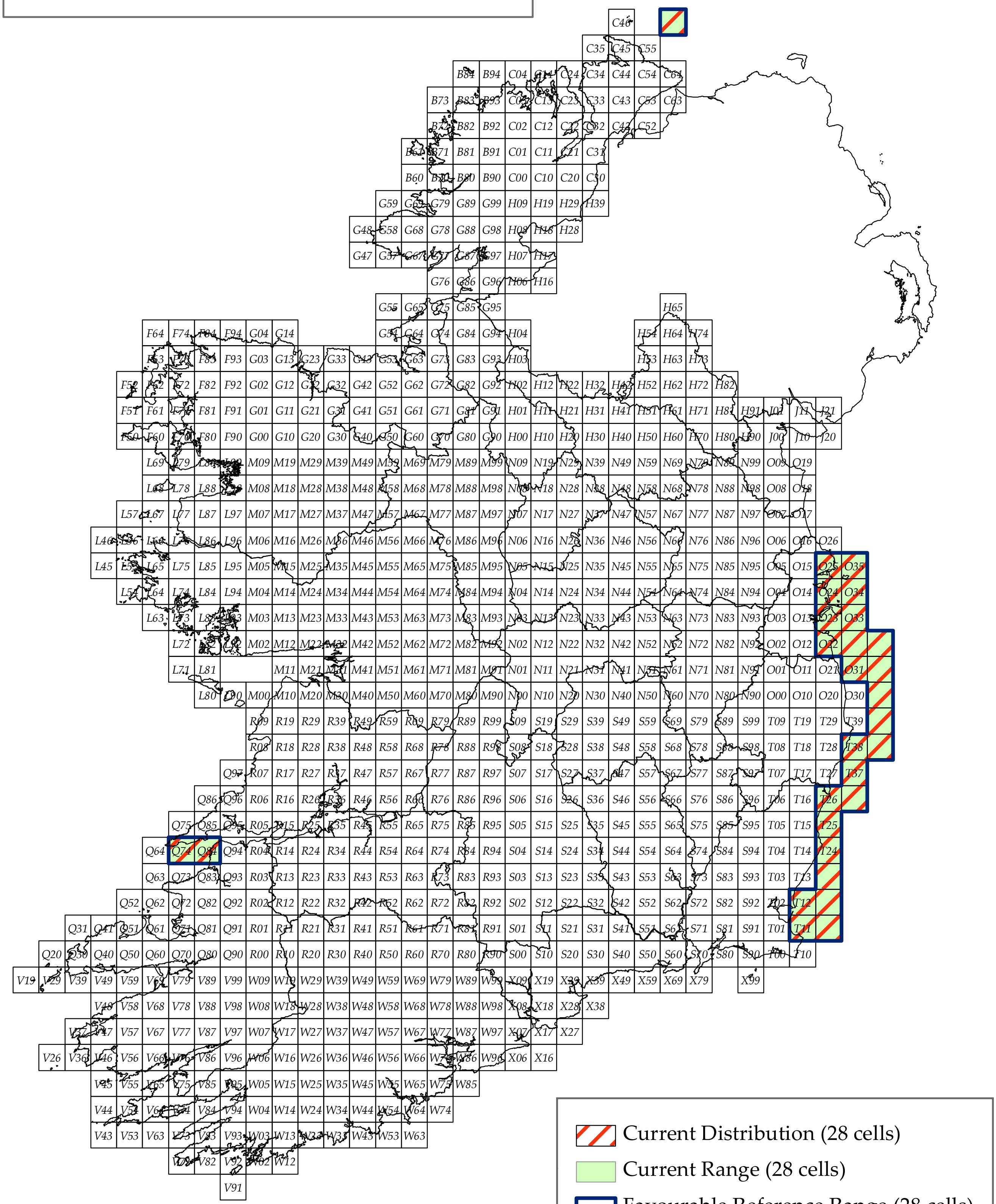
Field label	Note
Habitat code: 1110	
3.1.02 Method used	The area was calculated from polygon shapefiles drawn to align with the 20m contour of Sandbank habitats using a combination of expert judgement and existing mapping data. The intersection of this spatial layer with the total area covered within the Natura network was used to calculate the figure of 181 km2.

Habitat code: 1110

Field label	Note
3.2 Conservation measures	6.1 Additional Sandbank habitat has been included in the Natura 2000 network Following the Marine Atlantic Biogeographic seminar in 2009 the European Commission indicated that Ireland was required to designate one or a few additional sites (or maybe extension to sites) with a geographical direction to seek locations in the South-East and North coasts of Ireland. Additional survey and data analysis was undertaken to support these designations and two additional Special Areas of Conservation have been notified: Blackwater Bank, off the South-East coast, and Hempton's Turbot Bank, off the Donegal coast. These two sites bring approximately 80 km2 of additional habitat within the Network. 6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Sandbank habitats, substantial data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Sandbanks in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Habitats and Birds)(Sea-Fisheries) Regulations 2009 The introduction of legislation to support the implementation of the Habitats and Birds Directive requirements to the management of sea fisheries in Ireland. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high-level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessments of activities that would be required in the further development of project level activities. This particular SEA is targeted at an economic sector that has the potential for significant interaction with this habitat type, potentially with a number of Sandbanks in the Irish Sea, and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with this habitat type particularly in the identified Coastal Waters, including areas in the such as the banks in the Lower River Shannon, and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a level of spatial interaction with this habitat type and integrates the

	requirements of the Habitats Directive into the plan. 9.2 Completion of SEA for exploration of oil and gas exploration in Irish waters This SEA is directed towards hydrocarbon exploration that has the potential for a small degree of spatial interaction with Sandbank habitat in the Irish Sea and integrates the requirements of the Habitats Directive into the plan.

Sandbanks which are slightly covered by sea water all the time (1110)
Article 17 Assessment 2013



Current Distribution (28 cells)

Current Range (28 cells)

Favourable Reference Range (28 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
10-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1130

NAME: Estuaries

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1997-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published

Aquafact International Services Ltd. (2006). A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks & Wildlife Service. 314pp.

Aquafact International Services Ltd. (2007). A Survey of Mudflats and Sandflats. A report to National Parks & Wildlife Service. 253pp.

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Ordnance Survey of Ireland, 1:50,000 Discovery Series maps

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	18800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	18800
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	801		
2.4.2 Year or period	1997-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	801	
	operator	N/A	
	unknown	No	
	method	The current Area is considered to be the baseline value. The FRA has been adjusted to the current Area as there is no evidence of a decline since the Directive came into force and it is likely to adequate to ensure the long term viability of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	N/A
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	high importance (H)	N/A
suspension culture (F01.02)	medium importance (M)	N/A

nautical sports (G01.01)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	N/A
nautical sports (G01.01)	low importance (L)	N/A
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A
bottom culture (F01.03)	low importance (L)	N/A
suspension culture (F01.02)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Angulus tenuis
Chaetozone gibber
Corophium volutator
Crangon crangon
Eteone longa
Fabulina fabula
Hediste diversicolor
Nephtys cirrosa
Nephtys hombergii
Nucula nucleus
Owenia fusiformis
Pygospio elegans
Scolelepis squamata
Scoloplos armiger
Spio martinensis
Thyasira flexuosa
Tubificoides benedii
Tubificoides pseudogaster

Fucus vesiculosus

Fucus spiralis

Mytilus edulis

Laminaria digitata

2.7.2 Species method used	The main source of data for Estuarine habitats have been from a national evaluation of the prevalence of Annex I habitats within and without of SACs. The data was collected using various methods including direct sampling of the substrate and remote sensing using drop-down cameras in less accessible sites. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The area listed as Qualifying Interest within the SAC network is 525km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.8.6 Overall trend in Conservation Status	improving (+)	

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	674	max	674
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Enhance Unknown
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Both	Enhance Unknown

Field label	Note
Habitat code: 1130	
0.2 Habitat code	The EU interpretation manual describes the habitat Estuary 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, from the high water mark to the subtidal, are frequently observed to be composed of a range of distinct substrates. The high water points of estuaries are often formed from boulders/shingle and frequently from man-made margins in urban areas. The intertidal flanks exposed to the forces that form the estuarine habitat can be composed of deposited material such as sand and mud/silt. The Estuarine bed or channel is eroded to the greatest extent by the movement of the river channel and is consequently generally coarse material or bedrock. The topographical gradient of the Estuary heavily influences the type of flanking material and the rate of deposition. In faster flowing estuaries from shorter rivers little alluvium may aggregate whereas in sites at the terminus of larger river basins a significant fringing mudflat or sandflat may accumulate. The exposure of the Estuarine channel to the open sea also plays a significant role in shaping and mixing the substrate. Estuaries frequently inundated with large swell driven waves experience actions that mobilize and usually remove finer sediments. The degree of tidal range can effect mobilization of finer fractions but may act also to reduce downstream current velocities such that deposition of coarser material occurs and may result in the formation of a delta. On top of all these factors there is also seasonality to the structure of the Estuary with the amount of riverine water and seawater entering and exiting the habitat being subject to flux. The size of estuaries in Ireland varies greatly from the 3 hectare Easky Estuary in Co. Sligo to the Lower River Shannon Estuary of 242 square kilometres. The type of biological communities found at estuaries is quite variable across Ireland. Currently, approximately 50% of the national resource of Estuary 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 which was often characterised by the presence of the following species Corophium volutator, Crangon crangon, Eteone longa, Hediste diversicolor, Pygospio elegans, Scoloplos armiger, Spio martinensis, Tubificoides benedii, and Tubificoides pseudogaster where a third of the national resource was within Lower River Shannon SAC. The next most prevalent broad community type recognised at around 30% of Estuary habitat was Fine sand to sand and again the largest proportion of the national resource was within Lower River Shannon SAC with typifying species including Angulus tenuis, Nephtys cirrosa, Scolelepis squamata, Scoloplos armiger, and Spio martinensis, Tubificoides benedii, and Tubificoides pseudogaster. Twenty percent of the remaining Estuary habitat was identified as being Muddy sands/Sandy Muds Community and the characterising species included Chaetozone gibber, Fabulina fabula, Nephtys hombergii, Nucula nucleus, Owenia fusiformis, and Thyasira flexuosa and the greatest proportion of this community was within Lough Swilly SAC. The remaining communities included subtidal faunal turf, intertidal fucoid reef (Fucus vesiculosus and Fucus spiralis) with frequent occurrence of Mytilus edulis, mixed sediment, and Laminaria digitata dominated reef. Estuarine habitats also form a significant resource for various bird and mammal species for feeding, breeding and resting.

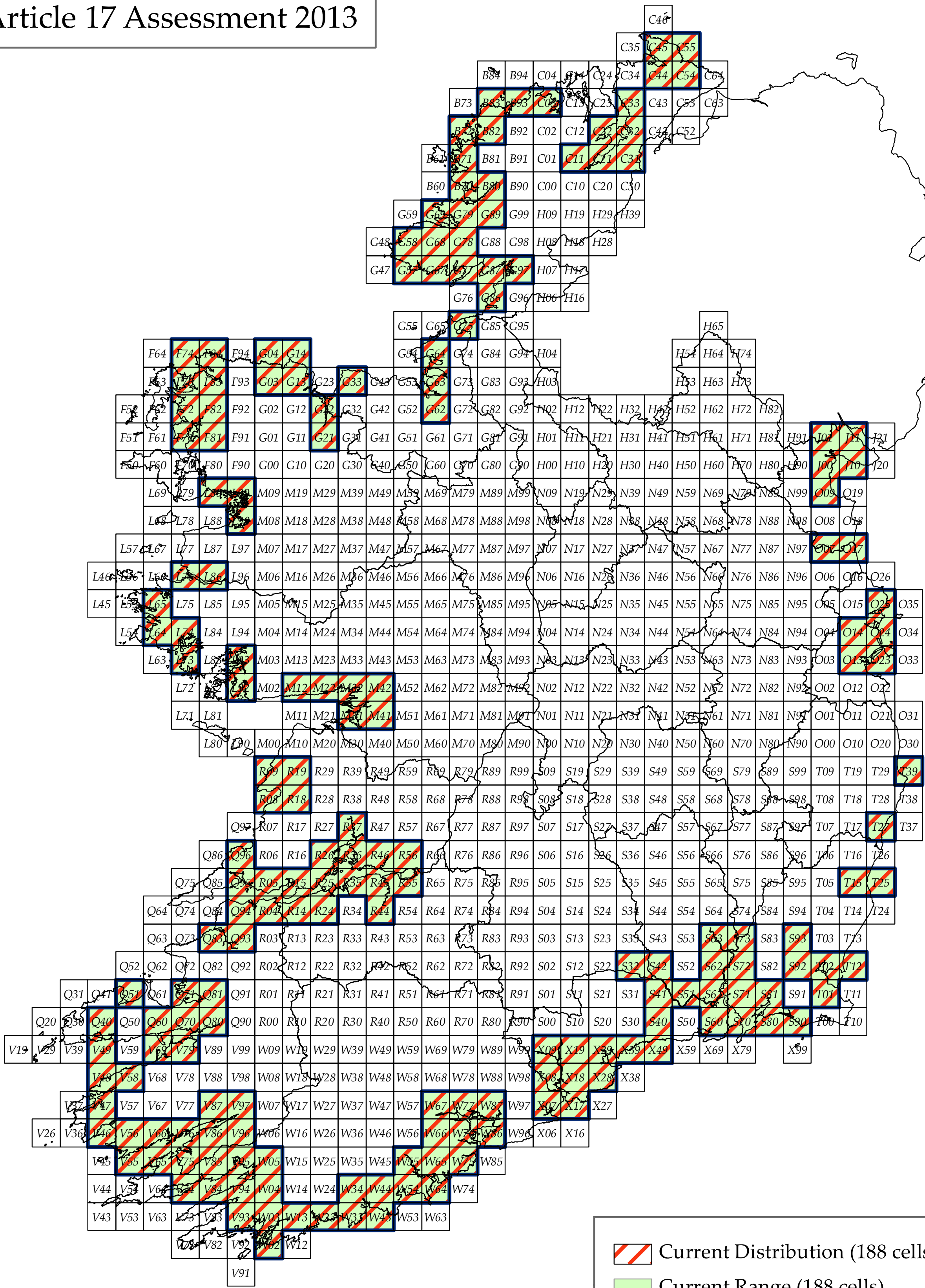
Field label	Note
Habitat code: 1130	
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.
1.1.02 Method used - map	GIS mapping of Estuary habitat was primarily achieved by use of a data set generated by the Environmental Protection Agency in fulfilment of the Water Framework Directive identifying transitional water bodies subject to freshwater influence. This data set was cross-referenced against the high and low water marks/vectors delineated by the Ordnance Survey of Ireland Discovery Series (1: 50,000). This was supplemented with reference and verification from the aerial ortho-photography data set published by the OSI in 2005. Smaller estuaries that were below the resolvable power of about 0.5 hectare were excluded from the polygon shapefile.
1.1.05 Range map	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x 10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change in the Range of Estuary habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat range. The Range reported in 2007 was calculated as 15,100 km2 (151 x 100 km2) and in 2012 this figure is 18,800 km2 (188 x 100 km2). The development of the EPA dataset in relation to the WFD has aided in the resolution and verification of this habitat type.
2.4.01 Surface area	801 km2 was calculated from polygon shapefiles drawn to align with EPA and OSI datasets.
2.4.03 Method used - Area covered by habitat	The area was calculated from polygon shapefiles drawn to align with EPA and OSI datasets using a combination of expert judgement and existing mapping data.
2.4.05 Short-term trend - Trend direction	There is no evidence of a significant loss to the area of this habitat feature in Ireland.
2.4.13 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The data available in this round of reporting is a significant improvement on that available during the last round of reporting. See 2.3.10.
2.4.13 c) Reason for change - use of different method	The increase in Estuarine habitat between 2006 and 2012 reporting periods should not be interpreted as an increase in habitat area. The Area reported in 2007 was calculated as 324 km2 and in 2013 this figure is 801 km2. The latter figure is more accurate and has incorporated areas previously excluded on the basis of a different definition of habitat. The development of the EPA dataset in relation to the WFD has aided significantly in the resolution of particularly smaller estuaries and extended the area covered by the Lower River Shannon Estuary to a significant degree.

Field label	Note
Habitat code: 1130	
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012.Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.7.02 Typical species - method used	The data was collected using various methods including direct sampling of the substrate. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis.
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. The significant data collection exercise within Annex I marine habitats within this current reporting cycle has allowed an informed adjudication to be made concerning Estuary habitat. These data given the extensive spatial coverage of the national resource are capable of indentifying compromised habitat quality. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged “Favourable”, any combination below a threshold of 25% of the resource should be judged “Unfavourable – Inadequate”, and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are “Unfavourable – Bad”.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat

Field label	Note
Habitat code: 1130	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Unfavourable-Inadequate. Following extensive sampling of the benthic environment of Estuaries nationally, experts consider that excellent examples of good quality and resilient habitat are evident. Estuaries are widely found around the majority of the Irish coast. It is not considered likely that greater than twenty five percent of the national habitat area is unfavourable as regards its specific structures and functions. However, the noted pressures including reduced water quality (expressed through nutrient enrichment (N & P), accelerated growth of macroalgae/ phytoplankton or reduced concentrations of dissolved oxygen) and fishing/ aquaculture related activities could be interacting over a percentage of the national resource and may in a number of areas contribute to an expression of compromised Structure and Function. It is also considered that some highly sensitive areas (e.g. Zostera beds) may be adversely impacted by existing activities. Similarly, it remains unclear whether an area greater than 15% of Estuary communities is being persistently adversely impacted. Therefore the assessment is Unfavourable –Inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	There is likely to be a trend towards improvement in the condition of this habitat in the future.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Estuary Annex I habitat was judged to be good although greater clarity concerning typical species will undoubtedly provide further confidence. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Not applicable because the Future Prospects are judged favourable
2.8.05 Overall assessment of Conservation Status	Since there are three Favourable results in Range, Area, and Future Prospects, and one Unfavourable-Inadequate in relation to Structure and function, the overall conclusion is the habitat is currently “Unfavourable-Inadequate”.
2.8.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the condition of this habitat in the future.
3.1.01 a) Surface area - Minimum	674 km2 of the national resource of Estuary (1130) is currently within the network.
3.1.02 Method used	The area was calculated from polygon shapefiles drawn to align with EPA and OSI datasets using a combination of expert judgement and existing mapping data. The intersection of this spatial layer with the total area covered within the Natura network was used to calculate the figure of 678 km2.

Field label	Note
Habitat code: 1130	
3.2 Conservation measures	6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Estuary, substantial data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Estuary in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Habitats and Birds)(Sea-Fisheries) Regulations 2009 The introduction of legislation to support the implementation of the Habitats and Birds Directive requirements to the management of sea fisheries in Ireland. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessment that would be required in the further development of projects or activities. This particular SEA is targeted at an economic sector that has the potential for a level of spatial interaction with this habitat type, potentially in the Lower River Shannon cSAC, and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with this habitat type particularly in the identified Transitional Waters that often include Estuary and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a high level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA for exploration of oil and gas exploration in Irish waters This SEA is directed towards hydrocarbon exploration that has the potential a small degree of spatial interaction with Estuaries and integrates the requirements of the Habitats Directive into the plan.

Estuaries (1130)
Article 17 Assessment 2013



Current Distribution (188 cells)

Current Range (188 cells)

Favourable Reference Range (188 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
30-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1140

NAME: Mudflats and sandflats not covered by seawater at low tide

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1997-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published

Aquafact International Services Ltd. (2006). A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks & Wildlife Service. 314pp.

Aquatic Services Unit. (2007). A Survey of Mudflats and Sandflats. A report to National Parks & Wildlife Service. 253pp.

CMRC (2006-12). Marine Irish Digital Atlas. 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 & Wildlife Service. 99pp.

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. http://www.dcenr.gov.ie/Spatial+Data/Petroleum+Affairs/PAD+Spatial+Data+Downloads.htm.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

Falvey, J.P., Costello, M.J. & S. Dempsey. 1997. A survey of intertidal mudflats. Unpublished report to the National Parks & Wildlife Service, Dublin. 258 pp.

NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.

Ordnance Survey of Ireland, 1:50,000 Discovery Series maps

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	23300	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	23300
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	638		
2.4.2 Year or period	1997-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	638	
	operator	N/A	
	unknown	No	
	method	The current Area is considered to be the baseline value. The FRA has been adjusted to the current Area as there is no evidence of a decline since the Directive came into force and it is likely to be adequate to ensure the long term viability of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	N/A
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	high importance (H)	N/A
suspension culture (F01.02)	medium importance (M)	N/A

hand collection (F04.02.02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	N/A
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
bottom culture (F01.03)	low importance (L)	N/A
hand collection (F04.02.02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Angulus tenuis
Arenicola marina
Bathyporeia pilosa
Chaetozone gibber
Corophium volutator
Crangon crangon
Eteone longa
Fabulina fabula
Hediste diversicolor
Nephtys cirrosa
Nephtys hombergii
Nucula nucleus
Owenia fusiformis
Peringia ulvae
Pisione remota
Pontocrates spp.
Pygospio elegans
Scolelepis mesnili
Scolelepis squamata
Scoloplos armiger
Spio martinensis

Tharyx spp.

Thyasira flexuosa

Tubificoides benedii

Zostera marina

Zostera noltii

2.7.2 Species method used	The data was collected using various methods including direct sampling of the substrate. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The area listed as Qualifying Interest within the SAC network is 466km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		improving (+)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	537	max	537
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Enhance Unknown
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Inside	Enhance Unknown

Field label	Note
Habitat code: 1140	
0.2 Habitat code	This habitat is found exclusively between the low water and mean high water marks. It is often a subset of the Annex I habitats Large shallow and bay and Estuaries but is not dependent on those habitats for occurrence. The fundamental building block of this habitat is sediment ranging from around 1 micron to 2 millimeters. The finer silt and clay sediments are dominant in mud flats 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 characterized 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 arrangements also allows for a free draining habitat. These coarse beaches are consequently susceptible to not only marine forces but can be mobilized by wind to form coastal habitats. The degree of mobility and harsh physiological conditions poses a significant challenge to marine flora and fauna. The type of biological communities found at 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 which was often characterised by the presence of the following species Angulus tenuis, Corophium volutator, Crangon crangon, Eteone longa, Hediste diversicolor, Peringia ulvae, Pygospio elegans, Scoloplos armiger, Spio martinensis, Tharyx sp., and Tubificoides benedii where 44% of the national resource 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 was within Lower River Shannon SAC with typifying species including Angulus tenuis, Bathyporeia pilosa, Nephtys cirrosa, Pontocrates spp., Scolelepis mesnili, Scolelepis squamata, and Spio martinensis. The largest contribution of the remaining habitat was identified as being Muddy sands/Sandy Muds Community and the most prevalent species included Arenicola marina, Chaetozone gibber, Fabulina fabula, Nephtys hombergii, Nucula nucleus, Owenia fusiformis, and Thyasira flexuosa and the greatest proportion of this community was within Lough Swilly SAC. Occasional intertidal Zostera spp., mixed sediments and coarse sediment characterised by Pisione remota are reported. The bivalve Barnea candida, also known as white piddock, is rarely recorded in Ireland and is found in the intertidal at Bannow Bay SAC. Mudflats and Sandflats also form a significant resource for various bird and mammal species for feeding, breeding and resting.
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.

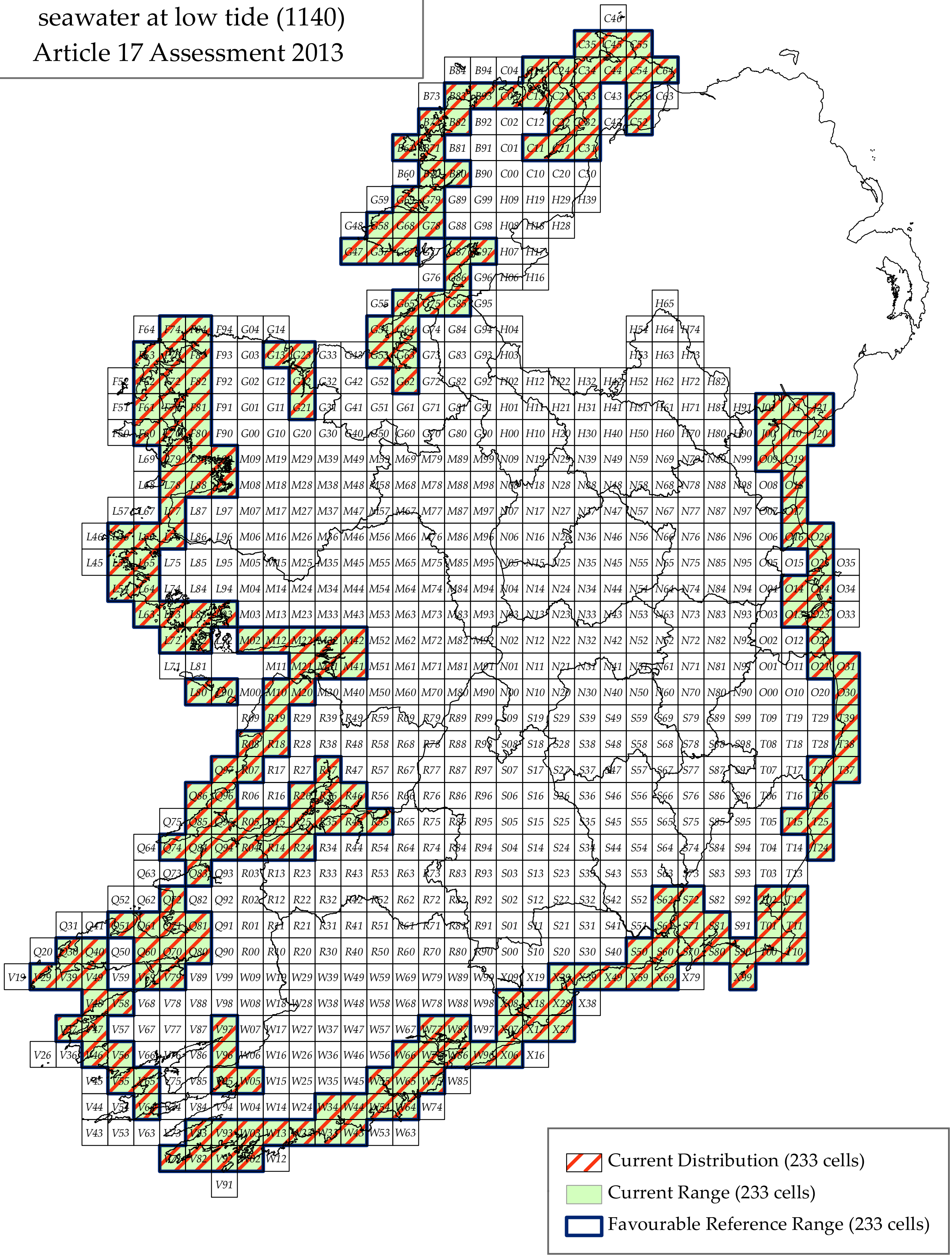
Field label	Note
Habitat code: 1140	
1.1.02 Method used - map	GIS mapping of Mudflat and Sandflat habitat was primarily achieved by use of a data set generated by use of high and low water marks/vectors delineated by the Ordnance Survey of Ireland Discovery Series (1: 50,000). This was validated by the use of the national aerial ortho-photography data set published by the OSI in 2005. Smaller polygons that were below the resolvable power of about 0.5 hectare were excluded from the polygon shapefile dataset.
1.1.05 Range map	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 10 km2 LAEA grid.
2.3.02 Method used - Range	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 10 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change of range in Mudflat and Sandflat habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat range (see Reasons for Change). The development of OSI datasets has aided in the resolution of particularly smaller Mudflat and Sandflat habitat and verification of this habitat type.
2.3.10 c) Reason for change - use of different method	The change in Mudflat and Sandflat habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat range. The Range reported in 2007 was calculated as 16,000 km2 (160 x 100 km2) and in 2012 this figure is 23,300 (233 x 100 km2).
2.4.03 Method used - Area covered by habitat	The area was calculated from polygon shapefiles drawn to align with OSI datasets using a combination of expert judgement and existing mapping data.
2.4.13 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The data available in this round of reporting is a significant improvement on that available during the last round of reporting. See 2.3.10.
2.4.13 c) Reason for change - use of different method	The change in Mudflat and Sandflat habitat between 2006 and 2012 reporting periods should not be interpreted as an increase in habitat area. The Area reported in 2007 was calculated as 566 km2 and in 2013 this figure is 638 km2. The latter figure is more accurate and has incorporated areas previously excluded on the basis of a different definition of habitat. The analysis of OSI datasets has aided significantly in the resolution of particularly smaller Mudflat and Sandflat and extended the area identified for this habitat feature particularly outside of Special Areas of Conservation.

Field label	Note
Habitat code: 1140	
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.7.02 Typical species - method used	The data was collected using various methods including direct sampling of the substrate. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis and the most frequently found species.
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. The significant data collection exercise within Annex I marine habitats within this current reporting cycle has allowed an informed adjudication to be made concerning Mudflat and Sandflat habitat. These data given the extensive spatial coverage of the national resource are capable of indentifying compromised habitat quality. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged “Favourable”, any combination below a threshold of 25% of the resource should be judged “Unfavourable – Inadequate”, and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are “Unfavourable – Bad”.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.

Field label	Note
Habitat code: 1140	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Unfavourable-Inadequate. A large amount of data has been collected for Mudflat and Sandflat across the country and it is judged that an area far exceeding 75% of the habitat is favourable in terms of Structure and Function. In the majority of sampled sites Mudflat and Sandflat habitat s the quality was good and apparently resilient to the operating pressures. There is a degree of commonality of the pressures with Estuaries habitat as these two Annex I habitats frequently co-occur. Water quality, fisheries/aquaculture and diverse use of the foreshore are seen to be the main activities operating in this habitat. Some of the communities associated with Mudflat and Sandflat, particularly eelgrass beds, are susceptible to pressure and may be compromised to a degree nationally.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	There is likely to be a trend towards improvement in the condition of this habitat in the future. This is mainly through the operation of current measures to improve water quality and fisheries management in the inshore environment.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Mudflat and Sandflat Annex I habitat was judged to be good although greater clarity concerning typical species will undoubtedly provide further confidence. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive.
2.8.05 Overall assessment of Conservation Status	Since there are three Favourable results in Range, Area, and Future Prospects, and one Unfavourable-Inadequate in relation to Structure and function, the overall conclusion is the habitat is currently "Unfavourable-Inadequate".
2.8.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the condition of this habitat in the future.
3.1.01 a) Surface area - Minimum	520 km2 of the national resource of Mudflats and sandflats not covered by seawater at low tide (1140) is currently within the Natura network.
3.1.02 Method used	The area was calculated from polygon shapefiles drawn to align with OSI datasets using a combination of expert judgement and existing mapping data. The intersection of this spatial layer with the total area covered within the Natura network was used to calculate the figure of 537 km2.

Field label	Note
Habitat code: 1140	
3.2 Conservation measures	6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Mudflat and Sandflat habitats, substantial data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Mudflat and Sandflat in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Habitats and Birds)(Sea-Fisheries) Regulations 2009 The introduction of legislation to support the implementation of the Habitats and Birds Directive requirements to the management of sea fisheries in Ireland. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high-level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessments of activities that would be required in the further development of project level activities. This particular SEA is targeted at an economic sector that has the potential for interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with this habitat type particularly in the identified Coastal Waters and Transitional Waters that often include Mudflat and Sandflat habitat and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a high level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA for exploration of oil and gas exploration in Irish waters This SEA is directed towards hydrocarbon exploration that has the potential for a small degree of spatial interaction with Mudflat and Sandflat and integrates the requirements of the Habitats Directive into the plan.

Mudflats and sandflats not covered by seawater at low tide (1140)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
30-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1150

NAME: Coastal lagoons

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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.

Good, J.A. & Butler, F.T. 2000. Coastal lagoon and saline lake shores as a habitat for Staphylinidae, Carabidae and Pselaphidae (Coleoptera) in Ireland. Part 2. Bulletin of the Irish Biogeographical Society. 24: 111-41

Hatch, P. & Healy, B. 1998. Aquatic vegetation of Irish coastal lagoons. Bulletin of the Irish Biogeographical Society. 21: 2-21.

Healy, B. 1999a. Survey of Irish coastal lagoons. 1996 and 1998. Vol. 1 Part 1. Background, description and summary of the surveys. Dúchas, Dublin.

Healy, B. 1999b. Survey of Irish coastal lagoons. 1996 and 1998. Vol. 1 Part 2. Lagoons surveyed in 1998. Dúchas, Dublin.

Healy, B. 2003. Coastal Lagoons. In: Wetlands of Ireland. R. Otte (ed). Chapter 4. University College Dublin Press. Dublin. 44-78.

Healy, B. & Oliver, G.A. 1998. Irish coastal lagoons: summary of a survey. Bulletin of the Irish Biogeographical Society. 21: 116-50.

Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997a. Coastal lagoons in the Republic of Ireland. Vol. 1. Background, outline and summary of the survey. Report to the National Parks and Wildlife Service, Dublin.

Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997b. Coastal lagoons in the Republic of Ireland. Vol. 2. Inventory of lagoons and saline lakes. Report to the National Parks and Wildlife Service, Dublin.

Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997c. Coastal lagoons in the Republic of Ireland. Vol. 3. Results of site surveys Parts 1-20. Report to the National Parks and Wildlife Service, Dublin.

Oliver, G.A. 2005. Seasonal changes and Biological Classification of Irish Coastal Lagoons. PhD Thesis. U.C.D., Dublin.

Oliver, G.A. 2007a. Inventory of coastal lagoons in the Republic of Ireland. Unpubl. report on behalf of NPWS.

Oliver, G.A. 2007b. Assessment of Conservation Status of Coastal Lagoon habitat in Ireland. Unpubl. report on behalf of NPWS.

Oliver, G.A. 2008. Report on current conservation status and future prospects of Lough Donnell lagoon, Co. Clare. 3rd March 2008. Unpubl. Report to NPWS.

Oliver, G. A. 2011. Survey of aquatic invertebrates of Shannon Airport Lagoon, Co. Clare. September 2011. Report on behalf of Scott Cawley, Dublin 2.

Oliver, G.A. 2012. Hydrological and Chemical survey of Cuskinny Lake, Great Island, Cork Harbour, Co. Cork. April – June 2012. Unpubl. report for Cork County Council.

Oliver, G.A. and Healy, B. 1998 Records of aquatic fauna from coastal lagoons in Ireland. Bulletin of the Irish Biogeographical Society. 21: 66-115.
Roden, C. 1999. Irish coastal lagoon survey, 1998. Vol. III, Flora. Dúchas, Dublin.
Roden, C. 2004. Irish coastal lagoon survey, 2003. Dúchas, Dublin.
Roden, C.M & G.A. Oliver, 2013. Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive, 2009-2011. Parts 1 and 2. Unpubl. report on behalf of the Environmental Protection Agency.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	6700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	6700
	operator	N/A
	unknown	No
	method	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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	23.9		
2.4.2 Year or period	1996-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	23.9	
	operator	N/A	
	unknown	No	
	method	As there is no evidence of a true change since the Directive came into force and there is no reason to assume that the 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.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Erosion (K01.01)	high importance (H)	N/A
Silting up (K01.02)	medium importance (M)	N/A
Fertilisation (A08)	high importance (H)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
accumulation of organic material (K02.02)	medium importance (M)	N/A
Marine and Freshwater Aquaculture (F01)	low importance (L)	N/A
removal of beach materials (C01.01.02)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
golf course (G02.01)	low importance (L)	N/A
circuit, track (G02.04)	low importance (L)	N/A
camping and caravans (G02.08)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
Erosion (K01.01)	high importance (H)	N/A
Silting up (K01.02)	medium importance (M)	N/A
Fertilisation (A08)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
accumulation of organic material (K02.02)	medium importance (M)	N/A
Marine and Freshwater Aquaculture (F01)	low importance (L)	N/A
removal of beach materials (C01.01.02)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
golf course (G02.01)	low importance (L)	N/A
circuit, track (G02.04)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Cordylophora caspia
Gonothyraea loveni
Idotea chelipes
Lekanesphaera hookeri
Corophium insidiosum
Gammarus chevreuxi
Palaemonetes varians
Hydobia ventrosa
Littorina tenebrosa
Onoba aculeus
Cerastoderma glaucum
Enochrus bicolor
Enochrus halophilus
Sigara stagnalis
Sigara selecta
Conopeum seurati
Chaetomorpha linum
Cladophora battersii
Ruppia cirrhosa
Ruppia maritima
Chara baltica
Chara canescens
Chara connivens
Lamprothamnion papulosum
Tolypella nidifica

2.7.2 Species method used	Surveys of flora and fauna of all lagoon habitat was carried out between 1996 and 2006 and the lagoons assessed using the presence and abundance of species on the list of lagoonal specialists compiled for use in Ireland (Healy 2003), Oliver (2005). The EPA surveys of 2009 - 2012 used the same methods. Generally, lagoon biota is highly resilient, and it is reasonable to assume that the typical species in the 50 lagoons, not visited in this reporting period, have not been more adversely affected than the 38 which were surveyed during this period.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	17.95 km2 of this habitat is listed as a qualifying interest within the SAC network.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	21.66	max	21.66
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Measures needed, but not implemented (1.2)	Legal Administrative	high importance (H)	Both	
Restoring/improving water quality (4.1)	Legal	high importance (H)	Both	Enhance Long term

Field label	Note
Habitat code: 1150	
0.2 Habitat code	Irish lagoons are defined on biological communities present rather than morphology. Any permanent water body, natural or artificial with salinity > 1 psu and a very restricted tidal prism is considered a lagoon. The great majority have Ruppia sp. present. Water bodies separated from the sea by barrier islands are classified as lagoons in some European countries but are not accepted as such in Ireland due to large tidal range and marine biota. Five main morphological types of lagoon are recognised in Ireland: 1. Classic "sedimentary" lagoons found on all parts of the coastline (21 lagoons, 41.4% of habitat area. 2. Artificial lagoons found on all parts of the coastline (30 lagoons, 35.2% of habitat area). 3. "Rock/peat" lagoons on the west coast, similar to lagoons in Scotland, but otherwise rare in Europe (18 lagoons, 20% of habitat area). 4. "Karst" lagoons found in parts of Counties Clare and Galway, and within Europe, possibly unique to Ireland (11 lagoons, 4.5% of habitat area). 5. "Saltmarsh" lagoons (6 lagoons, 1.5% of habitat area).
1.1.01 Distribution map	A LAEA projection was derived by transforming the Irish Grid distribution map referred to in 1.1.4
1.1.02 Method used - map	1.1.2 Surveys of 36 coastal lagoons were carried out initially in 1996 and 1998 (Healy 1999a, 2003). Subsequently, up to 2006, all lagoon sites in the country were surveyed and sampled (Oliver 2005, 2007; Roden 2004), making coastal lagoons one of the most completely surveyed habitats in the country. Between 2009 and 2012 The Environmental Protection Agency commissioned surveys of 21 lagoons as part of Ireland's obligations under the Water Framework Directive (Roden and Oliver 2012). During that time the following data was collected on 12 occasions from each lagoon: MRP phosphorus, D.I.N. nitrogen, oxygen saturation, biological oxygen demand, chlorophyll, phytoplankton, benthic macrophytes and benthic fauna. In addition, another 5 lagoons were sampled less frequently during this period. For the 2008 assessment, the mapping of distribution was based on a point distribution file, and 62 cells were identified. In 2011, the lagoon maps were digitized which added 4 new cells to the distribution due to increased accuracy and realization that the boundary of some lagoons projected into an adjacent cell (North Slob channel T12, Lough Gill Q51, Durnesh Lake G87, Broadmeadow O14). Shannon Airport was plotted in the wrong position due to inaccurate mapping so that one cell was lost (R36) but the adjacent cell was gained (R35). One new site (Coornagillah) was added to the Inventory, which added one new cell to the distribution (V86).
1.1.03 Year or period	All known Irish lagoons were visited between 1996 and 2006 as part of NPWS funded surveys. A sub-set of 26 (79.8% of total habitat area) lagoons were surveyed for the EPA between 2009-2012 as part of work necessary to implement the WFD.
1.1.04 Additional distribution map	A map was produced by intersecting the known lagoons referred to in 1.1.2 with the 10km Irish Grid.
1.1.05 Range map	The distribution is considered to represent the range as there is no potential for the habitat outside the distribution.

Field label	Note
Habitat code: 1150	
2.2 Published sources	In addition to the published sources listed in the 2008 Assessment, Roden and Oliver (2012, 2013) sampled 26 lagoons for physical factors, nutrients, chlorophyll, phytoplankton benthic macrophytes and benthic fauna on behalf of the EPA. 21 of these (78.1% of total habitat area) were sampled frequently enough to provide reliable data on water quality and biological parameters. This data was used to derive a typology and suggested reference values for Irish lagoons for the purpose of the WFD. Inland Fisheries Ireland sampled fish fauna in 15 of these sites (Anon. 2010,2011, 2012). Oliver visited Lough Donnell following the natural breach of the barrier (Oliver 2008) and undertook a study of Cuskinny lagoon after a major pollution episode (Oliver 2012).
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	Lagoons of different morphological types can be found on all parts the coastline. Much of the eastern and southern coastline was embanked to carry roads and railways and large areas of saltmarsh were reclaimed. These areas may have included small, short-lived lagoons which no longer exist but there is no historical evidence of any large lagoons anywhere in the country that have been completely drained. Classic "sedimentary" lagoons are concentrated in the southeast but not exclusively. "Rock/peat" lagoons and "karst" lagoons are found on the west coasts, especially in Clare and Galway. Artificial lagoons are located on almost any part of the coastline.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	41 of the 88 lagoon sites have been revisited during the reporting period, which represents over 88% of the lagoon habitat in the country. Aerial photographs of the remaining 47 sites were examined using Bing maps (bing.com). There is no evidence to suggest a change in range.
2.3.09 a) Favourable reference range - In km2	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.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	One new lagoon was added to the inventory resulting in an additional 10km2 cell. This addition is due to improved knowledge rather than an expansion of the range.
2.3.10 c) Reason for change - use of different method	In the 2008 Assessment, Range was recorded as 8,500 km2 (85 cells x 100km2), whereas in the 2013 Assessment, Range is recorded as only 6,700 km2 (67 cells x 100km2). This is because in 2008, distribution was derived from a point distribution file, and range was then determined manually using subjective decisions to draw minimum convex polygons based on the habitat distribution cells. In this Assessment in 2013, distribution is 67 cells and this is considered the most accurate up to date figure for distribution based on more accurate data and improved knowledge (see 1.1.2), and it was decided that the Range should be equal to the Distribution, without any extra cells added to make up polygons as this included inappropriate cells where lagoons were unlikely ever to have been present. As a result, 23 cells have been lost from the 2008 Range, as the extra cells which make up the convex polygons, but in which no lagoons exist, have been dropped. Four cells have been gained due to more accurate mapping (digitization in 2011). New cells added due to redigitising by mapping project 2011: T12 - North Slob Channel Q51 - Lough Gill G87 – Durnesh O14 – Broadmeadow.
2.4.01 Surface area	See 2.4.3

Field label	Note
Habitat code: 1150	
2.4.03 Method used - Area covered by habitat	Maps were digitized with reference to the 1:5,000 Mapping Series, and then intersected with the 10km Irish Grid. The OSi 1:5000 vector dataset was used as the basis for the creation of the Inventory of Irish Coastal Lagoons polygons. shp dataset. The polylines from the OSi 1:5000 dataset which corresponded to the extent of the lagoons were copied into a new lagoon polyline dataset. These polylines were then converted into a polygon dataset. In cases where the OSi 1:5000 vector dataset did not contain any spatial data for lagoons identified in the Inventory, the OSi 2005 orthophotographs (1;40,000) were used as the base layer to manually digitize the boundary of these lagoons. It should be noted that expert knowledge was used to correct instances where what was indicated on the OSi 1:5,000 dataset did not match what was apparent on the ground or from the orthophotographs.
2.4.04 Short-term trend - Period	The default trend period was used
2.4.05 Short-term trend - Trend direction	Based on field survey of a sub-sample of lagoons and examination of aerial photographs on Bing maps (bingmaps.com) there is no evidence to suggest a change in area in the specified time period.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	One small lagoon (0.5ha) has been added to the Inventory since 2008 (Coornagillah) due to improved knowledge.
2.4.13 c) Reason for change - use of different method	Figure for area covered by habitat in the 2008 Assessment was 23.7 km2. There is a small difference in the figure for Area between the Assessments (+ 0.2 km2). The lagoon maps were digitized in 2011 and some of the figures for area of individual lagoons in 2013 are quite different to that used in the 2008 Assessment, but these differences are due to more accurate mapping and correction of previous errors. The true area of lagoon habitat is regarded as stable
2.5 Main pressures	The 2009-2012 EPA survey classified 21 sites (78.1% of total habitat area) in terms of water quality based on measurements of water chemistry, phytoplankton and benthic vegetation. This work provisionally rated 10 sites (56% of total habitat area) as poor or bad due to eutrophication. Drainage is an issue in two sites (Tacumshin, Shannon Airport lagoon). Aerial imagery and site visits show the erosion of the cobble barrier at Reenydonegan and Lough Donnell following the collapse of the drainage structures through the barrier. There also appeared to be anthropogenic modifications to the outlets of two lagoons (Aughinish, Maghery). In the case of the former, the impact on the hydrographic functioning is uncertain, while in the case of the latter, there was an apparent decline in salinity.
2.6 Main threats	The list of pressures are also listed as threats as there is no evidence to suggest that these will cease. Water pollution (eutrophication) is the greatest future threat for most lagoons. While some work has been done to implement the WFD, until sub basin management plans are drawn up for the most impacted sites, and implemented, anthropogenic eutrophication will continue to be a serious issue. As it is not possible to state how long it will take to implement this aspect of the WFD, it is not appropriate to assume that this threat will be removed in the immediate future. Climate change may represent a long term threat, especialy to sites with sedimentary barriers.
2.7.02 Typical species - method used	The list in 2.7.1 includes species either confined to, or commonest in brackish non tidal water in Ireland. See Healy (2003) and Oliver (2005) for rationale in defining lagoonal specialists.
2.7.03 Justification of % thresholds for trends	There is no deviation in Range or Area for the habitat.

Habitat code: 1150

Field label	Note
2.7.04 Structure and functions - Methods used	Since 2007 the Irish Environmental Protection Agency has conducted surveys on the environmental quality of 21 lagoons comprising 78.1% of the total lagoon area. These surveys took place between 2009 and 2012 and each site was visited on up to 12 occasions. This data is the largest additional body of data on the environmental quality of Irish Lagoons collected since 2007. Their primary purpose was to collect data to allow the implementation of the Water Framework Directive. Further information is also available for 5 other lagoons, including limited nutrient sampling and observations on changes in drainage. The EPA surveys classified lagoons into 2 types based on salinity. The environmental quality of the sites were based on water quality, phytoplankton, benthic macrophytes and benthic fauna. Chemical parameters were graded as follows, high, good and moderate. Biological parameters (phytoplankton, benthic macrophytes and benthic fauna) were graded as high, good, moderate, poor and bad. In the WFD assessment each site was classified on the median value of the parameters over all sampling rounds. Sites were rated high, good, moderate, poor or bad based on the least favourable rating of any parameter measured except fauna which was not used as it does not reflect changes in water quality. Two sites were rated as high, six were rated good, three were rated moderate, four were rated poor and six were rated bad. In this assessment, the WFD ratings of high to good are equated with Habitats Directive category favourable; moderate equated with unfavourable-inadequate and poor or bad equated with unfavourable-bad. While this provisional classification reflects water quality rather than more general environmental characteristics, decline in water quality is the most serious issue in conservation of Irish lagoons, therefore it is thought reasonable to equate that classification and Habitats Directive measures of environmental quality, unless there were major impacts on hydrographic functioning. As ten sites out of 21 (including 1319/1866 ha. or 71% of the total area sampled) were rated unfavourable bad the overall rating of structure and functions is rated Unfavourable-bad.

2.7.05 Other relevant information	Lady’s Island Lake and Tacumshin together constitute 29 % of the national resource. Wexford County Council have undertaken a programme to reduce nutrient inputs to Lady's Island Lake but no improvements in water quality are apparent, possibly due to other impacts or due to a lag –time in a response to the measures. Recent monitoring has shown that the current problem is now due to diffuse rather than point source pollution. Tacumshin is still being severely affected by an agricultural drainage scheme which maintains water levels consistently below the original natural level. NPWS funded a modelling project which aimed to identify optimal summer and winter water levels in Tacumshin, but the findings have not been implemented to date. It is difficult to be precise about the figures for the area affected in Tacumshin, as seasonal water levels vary considerably, depending on rainfall, summer temperatures and occasional breaching of the barrier. This lagoon also has a very flat bed and is very shallow (never more than a metre) so that a small change in lagoon depth results in a large change in lagoon area. Based on a topographic survey, the maximum area of Tacumshin is calculated to be 393ha based on a water level of 1.0m OD Malin. Much of the former lagoon bed is now taken over by reed beds and the area of open water, even in winter, is now much less. The area inundated prior to 2007, covered 95ha for only 6% of the year on average and there is no reason to think that this area has changed in this reporting period. Several lagoons are now managed as non-statutory nature reserves (Commoge Marsh, Clogheen/White's Marsh, Cuskinny, Lough Beg) but this does not give them any legal protection.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The distribution is considered to represent the range as there is no potential for the habitat outside the distribution. There is no evidence to suggest a change in range during the reporting period. Range is stable and not smaller than Favourable Reference Range. Therefore assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Figure for area covered by habitat in the 2008 Assessment was 23.7 km2. There is a small difference in the figure for Area within the reporting period (+0.2 ha), but this is due to improved knowledge and the use of different methods. The true Area of the habitat is stable and not smaller than Favourable Reference Area and without significant changes in distribution pattern within range. Therefore Area is assessed as Favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Drainage is an issue in two sites (Tacumshin, Shannon Airport lagoon). A large part of Tacumshin remains dry for most of the year and is becoming encroached on by swamp vegetation. A similar situation of encroachment is developing at Shannon. At Lady’s Island Lake the barrier is regularly breached to control water levels to prevent excessive inundation of surrounding lands and to facilitate the use of the site for breeding terns, in line with the SPA objectives for the site.Ten sites out of 21 sampled (1319/1866 ha. or 71% of the total area sampled) were rated unfavourable bad for water quality. Only 23 lagoon sites in the country, covering less than 20% (467.5ha) of total habitat area are regarded as being in Favourable Conservation Status based on water quality. Most of these are on the west coast in what are still relatively natural, undeveloped areas. As a result, more than 80% of habitat area is unfavourable. If more than 25% of the area is unfavourable as regards its specific structures and functions the assessment is Unfavourable-Bad. Therefore the overall rating of structure and functions is Unfavourable-bad.

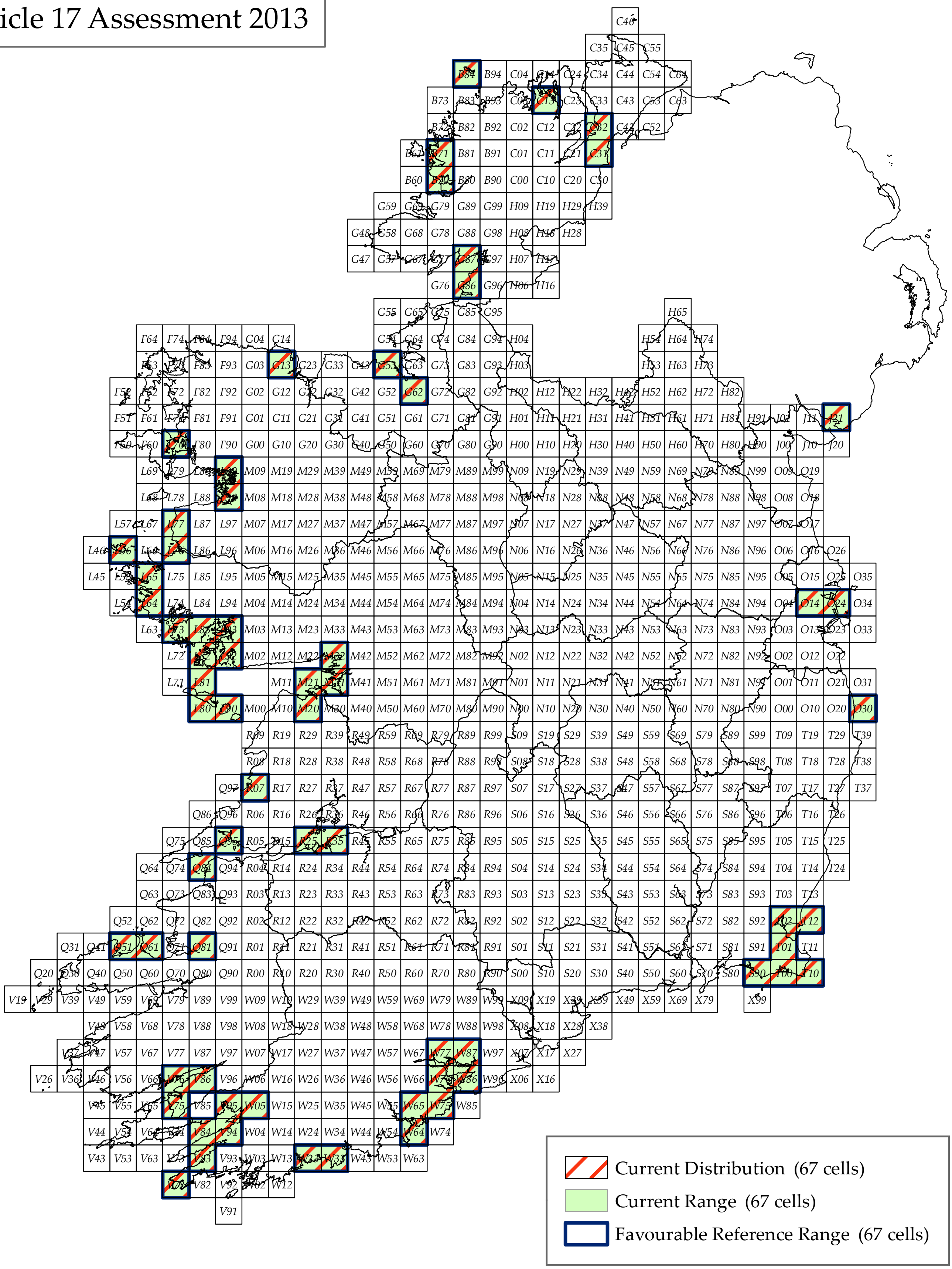
Field label	Note
Habitat code: 1150	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Trend since 2007 is based largely on the subset of lagoons sampled by the EPA in 2009-12. Some additional data is available for 5 other lagoons. Since 2007 five additional lagoons (out of 26) have apparently declined in quality to unfavourable-bad. This apparent decline is considered to be due to the availability of more extensive data on water quality and biology and is not necessarily due to an actual deterioration since 2007. The habitat was rated as unfavourable bad in 2007 and no change in this rating is justified in 2013. Therefore Conclusion for Structure Trend is Unfavourable-bad.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Range is stable and favourable since 2007. Area is unchanged since 2007 and Favourable. In relation to hydrographic functioning, it should be possible to control anthropogenic impacts. For some sites (Tacumshin, Shannon and Lady's Island Lake) issues of drainage and hydrology have arisen. At Shannon discussions are being held to restore the site. Investigations are underway at Lady's Island Lake to come to an agreed solution on the conflicting SAC and SPA priorities for the site. No progress has been made at Tacumshin. The most widespread issue concerning lagoons is water quality. In the recent EPA survey all lagoons on the south and east coasts showed evidence of eutrophication ranging from moderate to very severe. There has been no improvement in this situation since 2007. As a consequence of the uncertainty surrounding the successful development and implementation of sub-basin plans relevant to lagoons, future prospects must be considered Unfavourable-bad.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Improvements in lagoon water quality will be closely linked to the successful implementation of the WFD. Where the problem is diffuse pollution, the improvements will be dependent on the development and implementation of lagoon-specific sub-basin plans. These will take a significant time to develop and implement, and therefore no significant improvement is expected in the immediate future.
2.8.05 Overall assessment of Conservation Status	Range is stable and not smaller than Favourable Reference Range and therefore has been assessed as Favourable. Area is stable and not smaller than Favourable Reference Area and without significant changes in distribution pattern within range; therefore Area is assessed as Favourable. However, more than 25% of the area is unfavourable as regards its specific structures and functions in terms of water quality and therefore is rated as Unfavourable-Bad. As a consequence of the uncertainty surrounding the successful development and implementation of sub-basin plans relevant to lagoons, future prospects must be considered Unfavourable-bad. If one or more of the above are listed as Unfavourable – Bad then the overall assessment must be Unfavourable- BAD. Range of habitat = Favourable Area covered by habitat type = Favourable Specific structures and functions = Unfavourable-BAD Future Prospects = Unfavourable-BAD Overall assessment of Conservation Status = Unfavourable-BAD (one or more of above red)

Field label	Note
Habitat code: 1150	
2.8.06 Overall trend in Conservation Status	Since 2007 five additional lagoons have been rated as unfavourable-bad based on data collected in the 2009-2012 surveys. It is unclear if this change is due to a decrease in water quality or simply reflects better data, but expert opinion is that it is more likely to be a result of better data. Unfortunately there are no examples of an improvement in the water quality of any of the lagoon habitat since 2007. Consequently it must be concluded that water pollution remains a threat to the conservation of Irish lagoons. While the WFD is designed to eliminate the threat of water pollution, no effective actions have been undertaken to reduce nutrient inputs to lagoons. Implementation of the WFD has led to extensive data collecting and assessment of lagoon status, but of itself this will not reduce pollution. For eutrophication to be controlled sub basin management plans for all affected sites must be drawn up and then implemented. As this has not yet happened and may not happen for several years water pollution trend is rated as stable.
3.1.02 Method used	The distribution file was unioned with the SAC shape file. The area of lagoon habitat inside the SACs was then calculated.
3.1.03 Trend of surface area within the network	The trend for area is considered to be in line with the national trend.

Habitat code: 1150

3.2 Conservation measures	The habitat is protected through the Natura 2000 network, where it is listed as a qualifying interest in 25 SACs. (Measure 6.1). Conservation objectives for these SACs afford protection against proposed developments and activities, both within the designated sites and the wider catchment, through Article 6 (3). With the exception of Lady's Island, there are no measures being undertaken to restore or enhance the lagoon habitat in SACs. The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. The current RBMP measures are likely to be insufficient to protect lagoon habitat, however, for a number of reasons, most notably: 1. If high status is required for the more oligotrophic lagoons then the general WFD objective of good status will not allow for restoration of such lagoons. 2. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status for the lagoons in the more intensive agricultural areas of the east and south of Ireland. Given that the majority of phosphorus lost to surface waters has an agricultural origin, this is a significant concern and means that the current measures may not even succeed in preventing further deterioration of lagoon water quality. It is assumed that current and future RBMP cycles will lead to a gradual reduction in pressures from domestic on-site and municipal wastewaters. Unless an objective of high status is established for the more oligotrophic lagoons, the standards applied to such wastewaters may not be sufficiently stringent. It is likely that maintenance or restoration of lagoon habitat quality will require dedicated Sub-basin Management Plans with more stringent objectives and specific measures to address catchment-specific pressures, particularly diffuse pollution from agriculture. Lagoons that are listed as qualifying interests in SACs are protected by the 2011 Habitat Regulations; these regulate any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of lagoons is regulated under the Environment Liability Regulations 2008. Despite these regulations, there has been no improvement in lagoon water quality since 2007. As yet, no measures have been undertaken successfully to reduce eutrophication in lagoons. Where pollution is not due to an obvious point source, the WFD has the potential to improve the situation, but this has not happened yet. A plan to restore lagoon habitat at Shannon Airport is under discussion between airport authorities and NPWS.

Coastal Lagoons (1150)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
16-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1160

NAME: Large shallow inlets and bays

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1997-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published

Aquafact International Services Ltd. (2006). A Survey of Intertidal Mudflats and Sandflats in Ireland. A report to National Parks & Wildlife Service. 314pp.

Aquatic Services Unit. (2007). A Survey of Mudflats and Sandflats. A report to National Parks & Wildlife Service. 253pp.

Barron et al. (2011). National survey and assessment of the conservation status of Irish sea cliffs. Irish Wildlife Series. No. 53. 163 pp.

Cameron & Askew. (2011). EUSeaMap - Preparatory Action for development and assessment of a European broad-scale seabed habitat map final report. Available at http://jncc.gov.uk/euseamap.

CMRC (2006-12). Marine Irish Digital Atlas. 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 & Wildlife Service. 99pp.

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. (2003). Coast of Ireland, 2003 Oblique Imagery Survey Viewer. http://www.coastalhelicopterview.ie/.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

Falvey, J.P., Costello, M.J. & S. Dempsey. 1997. A survey of intertidal mudflats. Unpublished report to the National Parks & Wildlife Service, Dublin. 258 pp.

MERC. (2005-2009). Surveys of sensitive sublittoral benthic communities. Reports to National Parks & Wildlife Service.

MERC. (2010). Irish Sea Reef Survey. A report to the National Parks & Wildlife Service. 32 pp.

NPWS. (2010). A desk study of intertidal sea caves. Unpublished Report.

	NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.
	Ordnance Survey of Ireland, 1:50,000 Discovery Series maps

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	20800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	20800
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	4570		
2.4.2 Year or period	1997-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	4570	
	operator	N/A	
	unknown	No	
	method	The current Area is considered to be the baseline value. The FRA has been adjusted to the current Area as there is no evidence of a decline since the Directive came into force and it is likely to be adequate to ensure the long term viability of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	medium importance (M)	N/A
suspension culture (F01.02)	medium importance (M)	N/A
other outdoor sports and leisure activities (G01.08)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A
hand collection (F04.02.02)	low importance (L)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
other outdoor sports and leisure activities (G01.08)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A
bottom culture (F01.03)	low importance (L)	N/A
suspension culture (F01.02)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A
hand collection (F04.02.02)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Abra alba
Angulus tenuis
Arenicola marina
Chaetezone christei
Chaetozone gibber
Crangon crangon
Donax vittatus
Euclymene oerstedii
Fabulina fabula
Iphinoe trispinosa
Kurtiella bidentata
Lithothamnion corallioides
Lumbrineris gracilis
Melinna palmata
Nephtys cirrosa
Nephtys hombergii

Nucula nucleus
Owenia fusiformis
Phymatolithon calcareum
Pontocrates arenarius
Pygospio elegans
Sabellaria alveolata
Scolelepis mesnili
Scolelepis squamata
Scoloplos armiger
Spio martinensis
Spiophanes bombyx
Thyasira flexuosa
Zostera marina
Zostera noltii

2.7.2 Species method used	The data was collected using various methods including direct sampling of the substrate and remote sensing using drop-down cameras in less accessible sites. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis. This species list is indicative at this time and subject to further development.
2.7.3 Justification of % thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The area listed as Qualifying Interest within the SAC network is 1678 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		improving (+)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1585	max	1585
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			

3.1.3. Trend of surface area stable (0)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Enhance Unknown
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 1160	
0.2 Habitat code	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 and can report a variety of different habitat forms. They are variously composed of fine sediments to bedrock, intertidally and subtidally, and in Ireland are typified to a large extent by their constituent sub-habitats. They are frequently the vestiges of glacial erosion (Lough Swilly) or deposition (Clew Bay) and occasionally occur at the mouth of rivers where the lower density of freshwater flows over the fully marine benthos and vertical wind-driven mixing of layers is absent or significantly reduced. The shallow and sheltered nature of these habitats results in highly productive and frequently diverse areas in terms of both species and communities. Large Shallow Inlets and Bays habitats frequently incorporate a number of constituent Annex I habitats including Sandbank at the mouth of the Lower River Shannon where Nephtys cirrosa and Bathyporeia elegans characterised the habitat. Sediment and Reef communities constitute the majority of the remaining habitats (including the intertidal Annex I habitat). The three most prevalent sediment communities which account for 70% of the examined habitats of Large Shallow Inlets and Bays include: Fine Sand to Sand community shown usually to express dominance in the following species: Angulus tenuis, Arenicola marina, Chaetezone christei, Fabulina fabula, Iphinoe trispinosa, Nephtys cirrosa, Pontocrates arenarius, Pygospio elegans, Scolelepis mesnili, Scolelepis squamata, Scoloplos armiger, Spio martinensis, and Spiophanes bombyx; Muds to Fine Sand Community commonly reporting Crangon crangon and Pygospio elegans; and Muddy Sands/Sandy Muds Community typified by Abra alba, Chaetozone gibber, Donax vittatus, Euclymene oerstedii, Kurtiella bidentata, Lumbrineris gracilis, Melinna palmata, Nephtys hombergii, Nucula nucleus, Thyasira flexuosa and Owenia fusiformis. Habitats associated with hard substrates constitute around 20% of the intertidal and subtidal habitat. The typical species for inshore reef habitats is dependent on a number of factors including depth and exposure (described under 1170). Intertidal and subtidal hard ground in Bays and Inlets are frequently dominated by fucoid and Laminaria algal species. In deeper water the reef habitats tend to be predominantly sponges and anemones with associated polychaetes, molluscs, bryozoans, tunicates, crustaceans and fish species. A very significant proportion of some less frequently encountered species in Ireland have been found within the boundaries of Large Shallow Inlets and Bays including 85% of mapped maërl (Lithothamnion corallioides and Phymatolithon calcareum) and 70% of mapped eel grass beds (Zostera marina and Z. noltii), all records of the endemic species Edwardsia delapiae in Valentia Harbour, all mapped areas of the reef building polychaete Sabellaria alveolata, and the majority of such species as Neopentadactyla mixta, Pachycerianthus multiplicatus, Sabella pavonia, and Virgularia mirabilis. Limaria hians, commonly known as the gaping file shell forms a “nest” of byssus threads. Where these are sufficiently dense, they form reefs on the sediment; Mulroy Bay is the only known area in Ireland where these bivalves occur. This Annex I habitat also forms an important resource for various bird and mammal species (notably Annex II marine mammals) for feeding, breeding and resting.
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.

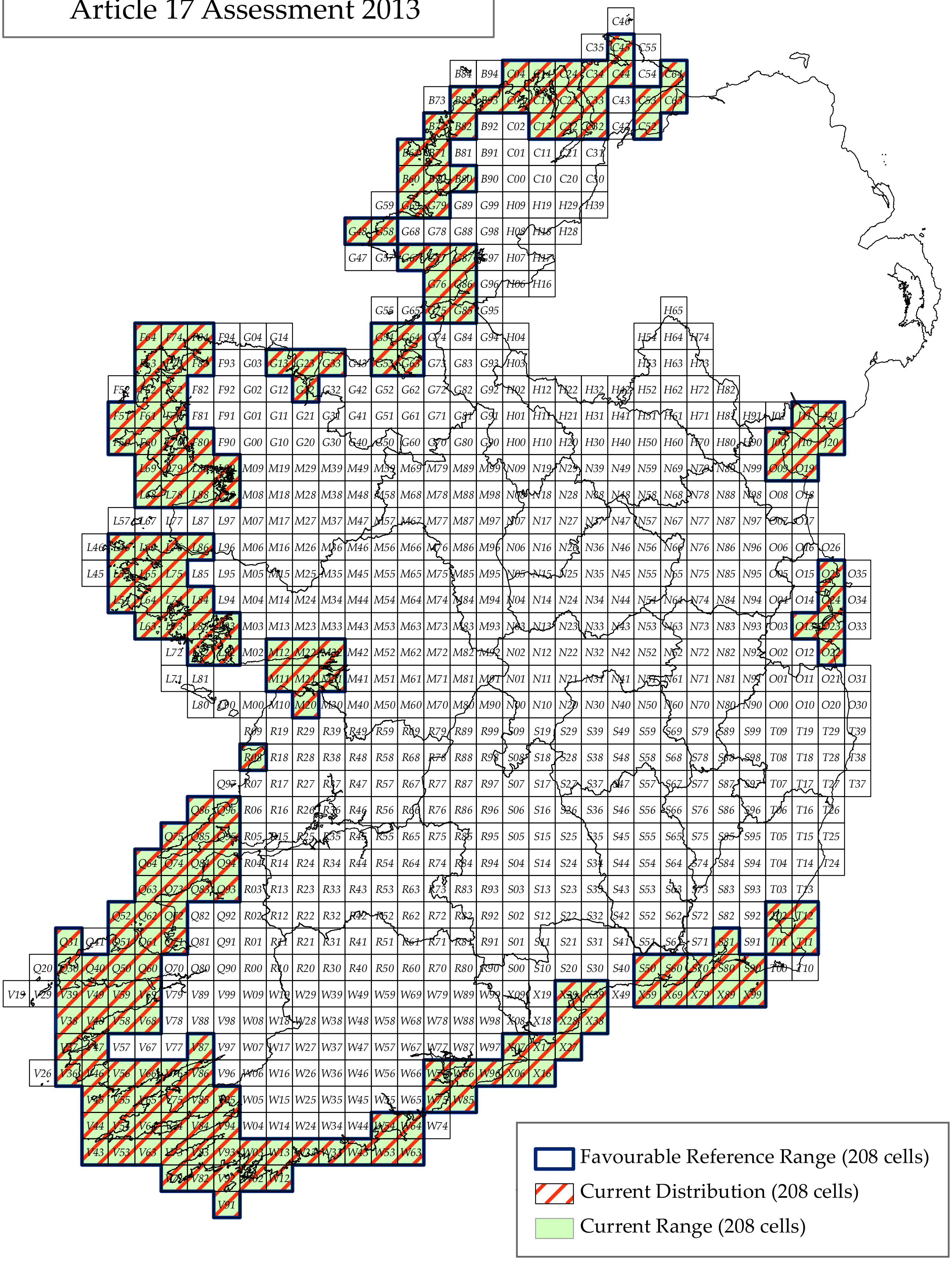
Field label	Note
Habitat code: 1160	
1.1.02 Method used - map	GIS mapping of Large Shallow Inlet and Bay habitat was primarily achieved by reference to a data set generated by the Environmental Protection Agency in fulfilment of the Water Framework Directive identifying transitional water and coastal water bodies. This data set was generated by reference to salinity values and was distinguished from the open coast by the prominence of enclosing headlands. This data set was cross-referenced against the high and low water marks/vectors delineated by the Ordnance Survey of Ireland Discovery Series (1: 50,000). This was supplemented with reference and verification from the aerial ortho-photography data set, where appropriate, published by the OSI in 2005.
1.1.05 Range map	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x 10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid. The habitat feature has not been completely mapped within Ireland and a significant proportion of the estimate is derived from data collected for sea bed/land-mass mapping.
2.3.02 Method used - Range	The Range Map for this habitat is the intersection of the polygon generated through the mapping of the habitat feature with a 10 x 10 km grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid. The habitat feature has not been completely mapped within Ireland and a significant proportion of the estimate is derived from data collected for sea bed/land-mass mapping.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change of range in Large Shallow Inlet and Bay habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. The development of the EPA dataset in relation to the WFD has aided in the resolution and verification of this habitat type.
2.3.10 c) Reason for change - use of different method	The change in the Range of Large Shallow Inlet and Bay habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. The Range reported in 2007 was calculated as 22,800 km2 (228 x 100 km2) and in 2012 this figure is 20,800 km2 (208 x 100 km2).
2.4.03 Method used - Area covered by habitat	The area was calculated from polygon shapefiles drawn to align with EPA and OSI datasets using a combination of expert judgement and existing mapping data.
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	There is no evidence of a significant loss to the area of this habitat feature in Ireland.
2.4.13 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The data available in this round of reporting is a significant improvement on that available during the last round of reporting. See 2.3.10.
2.4.13 c) Reason for change - use of different method	The previous estimate of 4,927 km2 in 2006 did not have access to the same data in relation to the WFD and the boundaries between Transitional/Coastal Water bodies and tended to over-estimate the resource in some locations beyond the current estimate of 4,570 km2.

Field label	Note
Habitat code: 1160	
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. Some pressures that are operating through this habitat feature have a higher incidence of occurrence in other adjacent habitats e.g. pollution issues are more prevalent in Estuarine habitats (and associated mudflats) than Large Shallow Inlets and Bays. This may be due to the greater occurrence of population centres in Estuaries than other habitat types. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites. In areas outside of Natura sites the development of management measures is less clear and for habitats such Large Shallow Inlet and Bay a greater proportion of the habitat is outside of the Network than habitats such as Mudflats and Sandflats or Estuaries.
2.7.02 Typical species - method used	The data was collected using various methods including direct sampling of the substrate and remote sensing using drop-down cameras in less accessible sites. The list of species derived in 2.7.1 reflects the community mapping undertaken using PRIMER analysis. This species list is indicative at this time and subject to further development.
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. The significant data collection exercise within Annex I marine habitats within this current reporting cycle has allowed an informed adjudication to be made concerning Large Shallow Inlet and Bay habitat. These data given the extensive spatial coverage of the national resource are capable of indentifying compromised habitat quality. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged “Favourable”, any combination below a threshold of 25% of the resource should be judged “Unfavourable – Inadequate”, and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are “Unfavourable – Bad”.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat

Field label	Note
Habitat code: 1160	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Unfavourable-Inadequate. Extensive sampling of Large Shallow Inlets and Bays habitat has informed a conclusion that less than 25% are compromised in terms of Structure and Function. This habitat is predominately composed of sedimentary benthic communities and it was not certain that more than 85% of the habitat is unaffected by pressures. It should be noted that there was some evidence that some of the particularly sensitive habitats e.g. maërl or eelgrass could be adversely impacted to a degree.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	There is likely to be a trend towards improvement in the condition of this habitat in the future.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Large Shallow Inlet and Bay Annex I habitat was judged to be good although greater clarity concerning typical species will undoubtedly provide further confidence. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive.
2.8.05 Overall assessment of Conservation Status	Since there are three Favourable results in Range, Area, and Future Prospects, and one Unfavourable-Inadequate in relation to Structure and function, the overall conclusion is the habitat is currently “Unfavourable-Inadequate”
2.8.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the condition of this habitat in the future.
3.1.01 a) Surface area - Minimum	1961 km2 of Large Shallow Inlet and Bay habitat are within the Natura network.
3.1.02 Method used	The area was calculated from polygon shapefiles drawn to align with EPA and OSI datasets using a combination of expert judgement and existing mapping data. The intersection of this spatial layer with the total area covered within the Natura network was used to calculate the figure of 1585 km2.

Field label	Note
Habitat code: 1160	
3.2 Conservation measures	6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Large Shallow Inlets and Bays, substantial data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Large Shallow Inlets and Bays in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Habitats and Birds)(Sea-Fisheries) Regulations 2009 The introduction of legislation to support the implementation of the Habitats and Birds Directive requirements to the management of sea fisheries in Ireland. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high-level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessments of activities that would be required in the further development of project level activities. This particular SEA is targeted at an economic sector that has the potential for significant interaction with this habitat type, potentially in the Lower River Shannon cSAC, and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with this habitat type particularly in the identified Coastal Waters that often include Large Shallow Inlets and Bays and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a high level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA for exploration of oil and gas exploration in Irish waters This SEA is directed towards hydrocarbon exploration that has the potential for a small degree of spatial interaction with Large Shallow Inlets and Bays and integrates the requirements of the Habitats Directive into the plan.

Large shallow inlets and bays (1160)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
30-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1170

NAME: Reefs

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1999-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published

Barron et al. (2011). National survey and assessment of the conservation status of Irish sea cliffs. Irish Wildlife Series. No. 53. 163 pp.

Cameron & Askew. (2011). EUSeaMap - Preparatory Action for development and assessment of a European broad-scale seabed habitat map final report. Available at http://jncc.gov.uk/euseamap.

CMRC (2006-12). Marine Irish Digital Atlas. 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 & Wildlife Service. 99pp.

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.

Davies et al. (2007). MESH South West Approaches Canyons Survey (MESH Cruise 01-07-01) Final Report. 156 pp.

DCENR. (2003). Coast of Ireland, 2003 Oblique Imagery Survey Viewer. http://www.coastalhelicopterview.ie/.

DCENR. (2013). Spatial data for seismic surveys and Hydrocarbon Wells. http://www.dcenr.gov.ie/Spatial+Data/Petroleum+Affairs/PAD+Spatial+Data+Downloads.htm.

Deegan. (2004). Irish Coldwater Coral Metadata Report. A report to National Parks & Wildlife Service. 83pp.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

Huvenne 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 et al. (1999). Occurrences of Lophelia pertusa on the Atlantic margin. British Geological Survey Technical Report WB/99/24.

MERC. (2005-2009). Surveys of sensitive sublittoral benthic communities. Reports to National Parks & Wildlife Service.

MERC. (2010). Irish Sea Reef Survey. A report to the National Parks & Wildlife Service. 32 pp.

NPWS. (2010). A desk study of intertidal sea caves. Unpublished Report.

Guinan & Leahy. (2010). Habitat Mapping of Geogenic Reef Offshore Ireland. An Unpublished report to the National Parks & Wildlife Service. 193 pp.

NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.

Poulsen & Suzyumov. (2004). North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes. International Conference and Twelfth Post-Cruise Meeting of the Training-Through-Research Programme. 57pp.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	130000	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	130000
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	32188		
2.4.2 Year or period	1999-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.12 Favourable reference area	area (km)	32188
	operator	N/A
	unknown	No
	method	The current Area is considered to be the baseline value. The FRA has been adjusted to the current Area as there is no evidence of a decline since the Directive came into force and it is likely to adequate to ensure the long term viability of the habitat.
2.4.13 Reason for change		Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	medium importance (M)	N/A
suspension culture (F01.02)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	N/A
industrial ports (D03.01.04)	low importance (L)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
fishing harbours (D03.01.03)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A
Exploration and extraction of oil or gas (C02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
Geotechnical survey (C01.06)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A
hand collection (F04.02.02)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	N/A
bottom culture (F01.03)	low importance (L)	N/A
suspension culture (F01.02)	low importance (L)	N/A
industrial ports (D03.01.04)	low importance (L)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
fishing harbours (D03.01.03)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A
Exploration and extraction of oil or gas (C02)	low importance (L)	N/A
estuarine and coastal dredging (J02.02.02)	low importance (L)	N/A
Geotechnical survey (C01.06)	low importance (L)	N/A

nautical sports (G01.01)	low importance (L)	N/A
hand collection (F04.02.02)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Actinia equina
Actinothoe sphyrodeta
Alcyonidium diaphanum
Alcyonium digitatum
Anemonia viridis
Antedon bifida
Anthomastus grandiflorus
Anthothela spp.
Aphrocallistes spp.
Aplysia punctata
Ascidia mentula
Aslia lefevrei
Balanus spp
Bathynectes spp
Bolocera spp
Botryllus schlosseri
Brisingella coronata
Calliostoma zizyphinum
Cancer pagurus
Carcinus maenas
Caryophyllia smithii
Ceramium spp
Chaecon spp
Chaetomorpha spp
Chimaera monstrosa
Chirostylus spp
Chondrus crispus
Cidaris cidaris
Cirrhipathes spp
Cliona stellata
Conger conger
Corallina officinalis
Corynactis viridis
Coryphaenoides rupestris

Cryptopleura ramosa
Delesseria sanguinea
Dendrodoa grossularia
Desmophyllum dianthus
Dictyota dichotoma
Dysidea fragilis
Echinus esculentus
Flabellum spp
Fucus spp
Galathea spp
Gibbula spp
Grantia compressa
Halecium halecium
Halichondria panicea
Hexactinellid spp
Holothuria forskali
Hymeniacidon perleve
Koehlermetra porrecta
Kophobelemnon spp
Labridae spp
Laminaria spp
Leiopathes spp
Lepidion eques
Littorina spp
Lomentaria articulata
Lophelia pertusa
Lotidae spp
Madrepora oculata
Marthasterias glacialis
Mastocarpus stellatus
Metridium spp
Mytilus edulis
Necora puber
Nemertesia antennina
Neocyttus helgae
Neolithoides spp
Nerophis lumbriciformis
Nucella lapillus
Pachymatisma johnstonia
Pagurus bernhardus

Paragorgia arborea
Paramuricea spp
Parantipathes spp
Patella spp
Pawsonia saxicola
Pennatula phosphorea
Pheronema spp
Pholis gunnellus
Pollachius spp
Polysiphonia spp
Pomatoceros triqueter
Porphyra spp
Pseudarchaster spp
Psolus squamatus
Sabellaria alveolata
Sagartia elegans
Scypha ciliata
Semibalanus balanoides
Solenosmilia variabilis
Spirorbis spp
Stichopathes gravieri
Synaphobranchus spp
Ulva spp

2.7.2 Species method used	The main source of data for Reef habitats have been from a national evaluation of the prevalence of Annex I habitats within and without of SACs. The data was collected using various methods including direct sampling of the substrate and remote sensing using drop-down cameras and ROVs in less accessible sites. This was supplemented by other offshore cruises particularly those in conjunction with the Marine Institute & GSI on the RV Celtic Explorer. The dominant species were identified as those either most frequently occurring or through PRIMER analysis where more detailed data was available.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Not applicable

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers declining (-)
2.8.4 Future prospects	assessment Bad (U2) qualifiers declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	3211	max	30900
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative	high importance (H)	Inside	Enhance Unknown
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Enhance Long term
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Both	Enhance Long term

Field label	Note
Habitat code: 1170	
0.2 Habitat code	Reef habitats are widespread marine features with immobile hard substrate available for colonisation by epifauna. Reef habitat in Irish waters ranges from the intertidal to 4500m below the sea surface and more than 400km 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 Reef is most often found in exposed areas with little influence of freshwater. In depths down to 30m along the Atlantic margin there is still a significant penetration of light and swell waves reach the reef. In depths below 30m (or shallower in some coastal 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 meters no light reaches the bottom and temperatures are usually cool and fairly constant. A significant type of the 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 or in the offshore by stony deep-water coral species. Intertidal and subtidal Reefs are frequently dominated by algal species including: 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., Ceramium spp.). Near shore Reef species commonly 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 (Botryllus 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). Recent work on Annex I habitats in the inshore has highlighted atypical presentation of species or communities. Mulroy Bay reported a few notable species including the sponges Dercitus bucklandi, Stelletta grubii and an un-described species of Polymastia and the anthozoan Parerythropodium coralloides. Reef habitat in Kilkieran showed some unusual presentations of the sponge and ascidian community, particularly 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, shows a restricted distribution with few records nationally.
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and World Geodetic System 84 and transformed to the prescribed LAEA GCS.

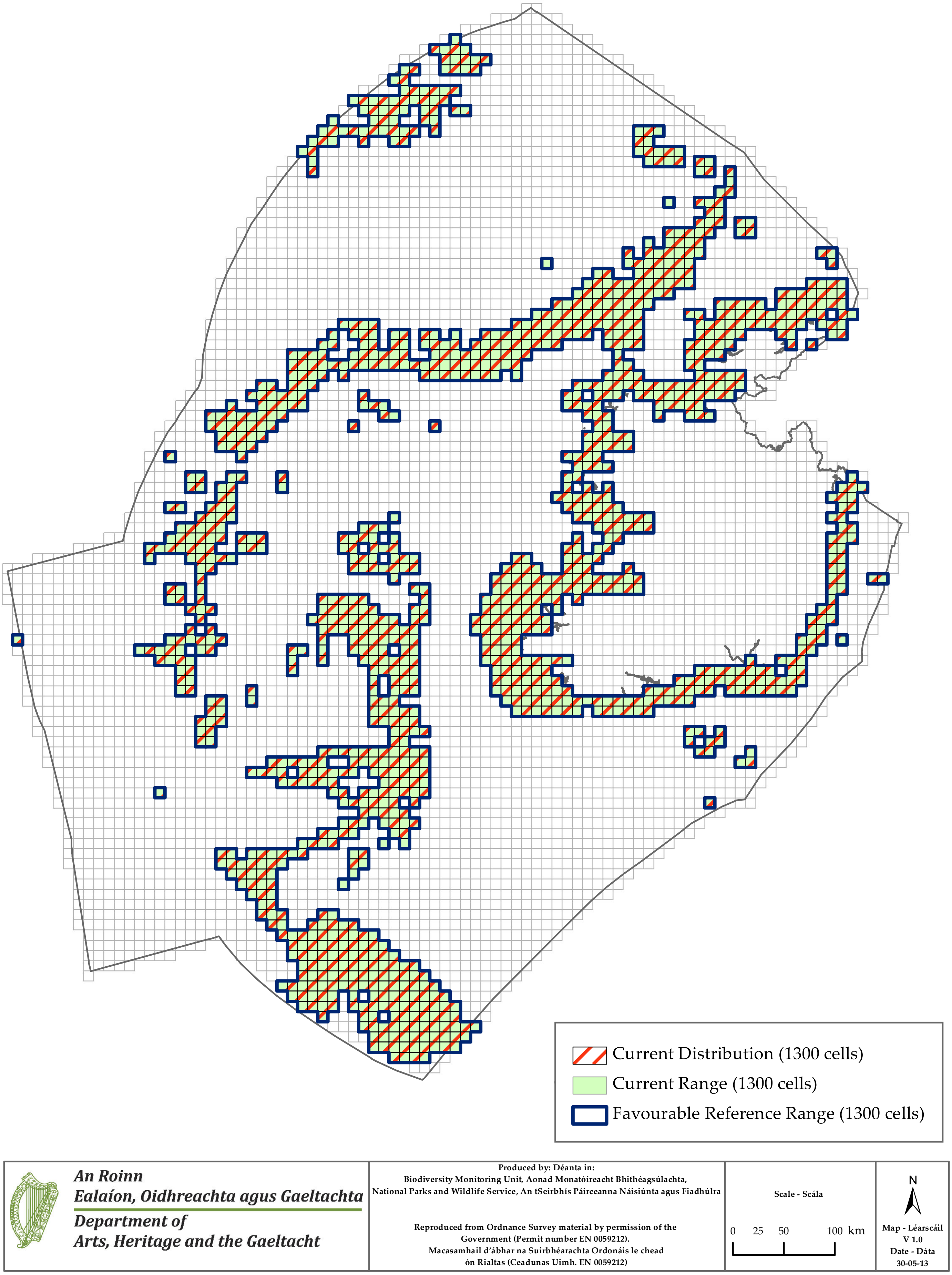
Field label	Note
Habitat code: 1170	
1.1.02 Method used - map	GIS mapping of Reef habitat was achieved by bringing a number of data sets together including those related to the incidence of coastal habitats, predicted and modelled habitat maps, hydrocarbon exploration, sustainable harvest, physical oceanographic surveys, geophysical and geotechnical surveys, and dedicated biological mapping using direct sampling and remote acquisition techniques. Almost 90,000 records were used to generate a range map of the feature across the jurisdiction. The intersection of these transformed point, polygon, and polyline data sets was used to populate the 100 km2 LAEA grid for the incidence of Reef habitat across the jurisdiction.
1.1.05 Range map	The Range Map for this habitat is the intersection of the point, polygon and polyline datasets transformed from ING/WGS84. The intersection of this transformed data was used to populate the 100 km2 LAEA grid.
2.3.02 Method used - Range	The Range Map for this habitat is the intersection of the point, polygon and polyline datasets transformed from ING/WGS84. The intersection of this transformed data was used to populate the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods. However, a significant amount of analysis has been undertaken on the prevalence of hard ground habitat through the Irish Exclusive Economic Zone. Particularly the extensive surveys undertaken by the Irish National Seabed Survey, surveys completed on habitat and bathymetry undertaken by MESH and INFOMAR, and work done to model habitats through MSFD and OSPAR frameworks have aided significantly in the understanding of Reef habitats in Irish waters.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change of range in the reported Range of Reef habitat between 2006 and 2012 reporting periods should not be interpreted as a change in actual range (see Reasons for Change).
2.3.10 c) Reason for change - use of different method	The change in the reported range of Reef habitat between 2006 and 2012 reporting periods should not be interpreted as a change in actual range. The Range reported in 2007 was calculated as 62,000 km2 (620 x 100 km2 from submitted form) and in 2012 this figure is 130,000 km2 (1300 x 100 km2). The 2006 figure was largely based on a small dataset of information. The 2012 estimate of Reef habitat brings together a number of disparate data sources looking at records extending back to the 1920s and incorporates a significant amount of data that has been generated related to this feature particularly in the offshore environment in recent years.
2.4.01 Surface area	32,188 km2. This figure was calculated from polygon data as it was not possible to extrapolate accurately from point or polyline records. Therefore it is likely that this figure may be modified in the future as further information becomes available. It is likely that through the national baseline mapping of Annex I habitats a more complete inventory of Reef habitats particularly within the SAC network will become available.
2.4.03 Method used - Area covered by habitat	The area was calculated from polygon shapefiles generated from a number of sources that have either directly sampled the seabed and found evidence of Reef habitats or from modelled predictions of Reef habitat generated from analysis of acoustically acquired data.
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	There is no evidence of a significant loss to the area of this habitat feature in Ireland.
2.4.13 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The data available in this round of reporting is a significant improvement on that available during the last round of reporting. See 2.3.10.
2.4.13 c) Reason for change - use of different method	The previous reporting in 2007 did not provide an area estimate for Reef habitat.

Field label	Note
Habitat code: 1170	
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.7.02 Typical species - method used	The main source of data for Reef habitats have been from a series of national surveys of Annex I habitats within and without of SACs. The data was collected using various methods including direct sampling of the substrate and remote sensing using drop-down cameras and ROVs in less accessible sites. This was supplemented by other offshore cruises particularly those in conjunction with the Marine Institute & GSI on the RV Celtic Explorer. The dominant species were identified as those either most frequently occurring or through PRIMER analysis where more detailed data was available.
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. Although some data has been collected in Reef habitat the majority of the evaluation of this habitat is reliant on expert judgement. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged "Favourable", any combination below a threshold of 25% of the resource should be judged "Unfavourable – Inadequate", and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are "Unfavourable – Bad".
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	A finalised inventory of the Reef resource is not completed. However, it is known that across the range of this habitat there are a number of activities that have a high prevalence although in a number of cases it is not possible to evaluate the actual impact. The resilience or recoverability of some of the national resource, particularly those associated with offshore coral and offshore geogenic reefs, is very low and any degree of interaction has the potential to compromise the ecological function and potentially elements of the structure. It should be noted that other types of reef particularly those in the inshore, intertidal and subtidal biogenic and geogenic, are likely to be in a better condition and suffering a lower degree of pressure. However, since the majority of the resource is contained in offshore reefs an interaction with the total national resource is likely to exceed a value greater than 25% of the national resource.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	It is not currently possible to assign a trend to Structure and Function. A significant proportion of the pressures/threats operating to affect this habitat are not within the framework of management measures designed to ensure conservation of habitats and species within this jurisdiction.

Field label	Note
Habitat code: 1170	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Reef Annex I habitat was judged to be Unfavourable-Bad. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, Sustainable practices may be delivered through the Marine Strategy Framework Directive.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	It is not currently possible to assign a trend to Future Prospects. A significant proportion of the pressures/threats operating to affect this habitat are not within the framework of management measures designed to ensure conservation of habitats and species within this jurisdiction.
2.8.05 Overall assessment of Conservation Status	Since there are two Favourable results in Range, Area, and two Unfavourable-Bad in relation to Structure and function and Future Prospects, the overall conclusion is the habitat is currently “Unfavourable-Bad”.
2.8.06 Overall trend in Conservation Status	Declining. Since there is no indication that pressures currently operating will reduce in significance in the future it must be concluded given the low resilience of the majority of this habitat type that the trend would be declining.
3.1.01 a) Surface area - Minimum	3211 km2. This figure is derived from the intersection of the polygon data with the Natura network
3.1.01 b) Surface area - Maximum	30900 km2. This figure incorporates data generated not only from polygon data but includes data generated from polyline and point data intersected with a grid.
3.1.02 Method used	The minimum value was calculated on the basis of current mostly modelled or predicted polygon data intersecting with the shapefile of the SAC network. The maximum value represents an intersection between Reef range (calculated from all data sets inclusive of polygon data) and SAC range based on the 100 km2 LAEA grids. It is likely that the maximum value is closer to the true position as 62% of point data and approximately 50% of polyline data is within the network and listed as Qualifying Interests for designated sites. Although a substantial effort has been made in the last number of years a lot of the data generated for reef habitat is based on modelled predictions and may be an underestimate of the resource.

Habitat code: 1170

Field label	Note
3.2 Conservation measures	6.1 Additional Reef habitat has been included in the Natura 2000 network The Marine Atlantic Biogeographic seminar in 2009 concluded that Ireland should designate one or a few additional sites (or maybe extension to sites), including geogenic Reefs to ensure full coverage of the range. Additional survey and data analysis was undertaken to support these designations and three additional Special Areas of Conservation have been notified: Porcupine Bank Canyon SAC, Rockabill to Dalkey Island SAC, and South East Rockall Bank SAC. 6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Reef habitat, substantial data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Reefs in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Habitats and Birds)(Sea-Fisheries) Regulations 2009 The introduction of legislation to support the implementation of the Habitats and Birds Directive requirements to the management of sea fisheries in Ireland. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high-level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessments of activities that would be required in the further development of project level activities. This particular SEA is targeted at an economic sector that has the potential for a level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with Reef habitat particularly in the Transitional and Coastal waters and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a high level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA for exploration of oil and gas exploration in Irish waters This SEA is directed towards hydrocarbon exploration that has the potential for a small degree of spatial interaction with Reef and integrates the requirements of the Habitats Directive into the plan.



Current Distribution (1300 cells)
Current Range (1300 cells)
Favourable Reference Range (1300 cells)
An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht
Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
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Scale - Scála
0 25 50 100 km
N
Map - Léarscáil
V 1.0
Date - Dáta
30-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1210

NAME: Annual vegetation of drift lines

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

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

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

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.

Power, G. (2011a). Dungarvan habitat Survey. Report prepared for Waterford County Council.

Power, G. (2011b). Tramore habitat Survey. Report prepared for Waterford County Council.

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

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	18200	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	18200
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Directive came into force.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.9991				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.09	max		confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	1			
	operator	N/A			
	unknown	No			
	method	The FRA was estimated at 1km in reporting in 2007 on the basis of the CMP habitat maps, habitat records provided by MPSU and records of Cakile maritima from Preston et al (2002). However, there is no new data to suggest that this needs to be adjusted, bearing in mind that this is a highly dynamic habitat that is subject to seasonal fluctuations.			
2.4.13 Reason for change	Genuine				

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Agriculture activities not referred to above (A11)	medium importance (M)	N/A
removal of beach materials (C01.01.02)	medium importance (M)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
Dumping, depositing of dredged deposits (J02.11.01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
reduction or loss of specific habitat features (J03.01)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Agriculture activities not referred to above (A11)	medium importance (M)	N/A
removal of beach materials (C01.01.02)	medium importance (M)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
reduction or loss of specific habitat features (J03.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Atriplex spp.
Beta vulgaris
Cakile maritima
Galium aparine
Honckenya peploides

Polygonum oxyspermum raii

Salsola kali

Tripleurospermum maritimum

2.7.2 Species method used	Species listed in 2.7.1, represent the selection of species that were deemed to provide the best indication of whether habitat was present and is not a comprehensive list of the typical species recorded here. The species were selected following a literature review, taking into account the species listed in the Interpretation manual of European habitats, the JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés carried out in 2011 as part of the Sand Dunes Monitoring Project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Loss of area due to human activities was considered to represent a deterioration in the area assessment.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	As part of the monitoring programme for assessing the conservation status of this habitat, typical species, presence of negative indicator species and non-native species were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. See Delaney et al. (2013) for full list of structure and functions criteria assessed.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.39	max	0.39
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Inside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		low importance (L)	Both	Not evaluated
Restoring coastal areas (4.4)	Recurrent	low importance (L)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	low importance (L)	Outside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 1210	
0.2 Habitat code	This type of vegetation occurs on sandy, shingle or stony substrate at the upper part of the strand, around the high tide mark. Water-borne material including organic matter is deposited on the shore and provides nutrients and a seed source for vegetation. The vegetation predominantly consists of annual species, such as Atriplex species, Cakile maritima and Salsola kali, which are highly specialised to deal with the harsh conditions of high salinity, wind exposure and drought. This habitat is generally very species-poor, fragmented and tends not to occupy large areas due to its narrow, linear nature. It exists in a state of instability and may be absent in some years due to natural and/or anthropogenic causes. In Ireland, the habitat includes drift line vegetation on sandy substrates as well as drift line vegetation dominated by annuals found on shingle.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2009), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 1210 distribution map. Supplementary information was gathered from Ó Riain, (2007) and Power (2011a, b). Recent records from Preston et al (2002) for the distribution of Cakile maritima were also included.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map (1996-2012).
1.1.04 Additional distribution map	1210 polygons from various data sources (see section 2.2) were intersected with the ING 10 km square grid to determine the national grid distribution. The habitat was present in 130 grid cells. A comparison with the distribution map generated in 2007 shows that 1210 was found in three new grid cells due to natural fluctuations. The habitat was found to be absent from nine grid cells where it had previously been recorded, and this change is the result of improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. Cells without any coastline were removed.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. Guidelines for future monitoring were also developed. 71 of these sites supported Annual vegetation of driftlines habitat (1210). Delaney et al. (2013) monitored a subset of these sites, including 18 of the sites that supported 1210. In addition, the SDM further refined the methodology for monitoring habiats as part of the Sand Dunes Monitoring project (SDM). Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Recent distribution records from Preston et al. (2002) for Cakile maritima were used as an indicator of areas outside dune systems that might support this habitat. Gaynor (2008) provided additional background information on the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This figure is derived from the range map referred to in 1.1.5.

Field label	Note
Habitat code: 1210	
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2009), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 1210 distribution map. Supplementary information was gathered from Ó Riain, (2007) and Power (2011a, b). Recent records from Preston et al (2002) for the distribution of Cakile maritima were also included. The range tool was applied to the distribution map. The final range map was edited after consultation with the NPWS sand dunes expert, Dr. Karen Gaynor. A set of 19 cells generated by the rnage tool was removed from the range map as these cells do not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The increase in range is primarily due to a change in the range tool, while natural habitat fluctuations and improved knowledge also contribute. However, this is a very dynamic habitat and the area is likely to fluctuate from season to season and year to year.
2.3.09 a) Favourable reference range - In km2	There is no indication that there has been anthropogenic loss of range since implementation of the Habitats Directive.
2.3.10 c) Reason for change - use of different method	See 2.3.4.
2.4.01 Surface area	The surface area reported in 2007 was 1km2, which was estimated on the basis of the Coastal Monitoring Project habitat maps, habitat records provided by MPSU and recent records of Cakile maritima from Preston et al. (2002). Current area was calculated by subtracting the known reduction in habitat (0.0009km2) recorded from sites surveyed during the Sand Dunes Monitoring project (Delaney et al., 2013) from the total habitat area estimated to have been present in 2007 of 1km2. It should be noted that the indicator species Cakile maritima can also occur in embryonic dunes (2110), but 1210 can also occur at sites that do not possess dunes. In summary, the surface area figure should be treated with some caution in view of the highly dynamic and ephemeral nature of the habitat.
2.4.02 Year or period	Field surveys were carried out at 181 dune sites between 2004 and 2006 as part of the Coastal Monitoring Project (Ryle et al, 2009) and follow up monitoring surveys were carried out at a sample of 39 sites between 2011 and 2012 as part of the Sand Dunes Monitoring project (SDM) (Delaney et al, 2013). 1210 was mapped at 22 sites during the SDM.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). It was not possible to estimate the amount of loss which occurred in the years between 2001 and 2004.
2.4.05 Short-term trend - Trend direction	Most of the change in area since the assessment in 2007 is the result of natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. 0.0009 km2 was lost as a direct result of human activities within the 39 sites revisited during the Sand Dunes Monitoring project (SDM). Loss of habitat was due to construction of a walkway at site 155 Kincaslough and coastal defences at site 133 Strandhill.
2.4.06 a) Short-term trend - Magnitude - Minimum	Within the 39 sites revisited during the Sand Dunes Monitoring project, 0.0009 km2 was lost since the Coastal Monitoring Project as a direct result of human activities. 0.0009 km2 is equal to loss of 0.45% of the habitat within the sample of 39 sites resurveyed as part of the SDM. This is a loss of 0.09% nationally since the Coastal Monitoring Project.

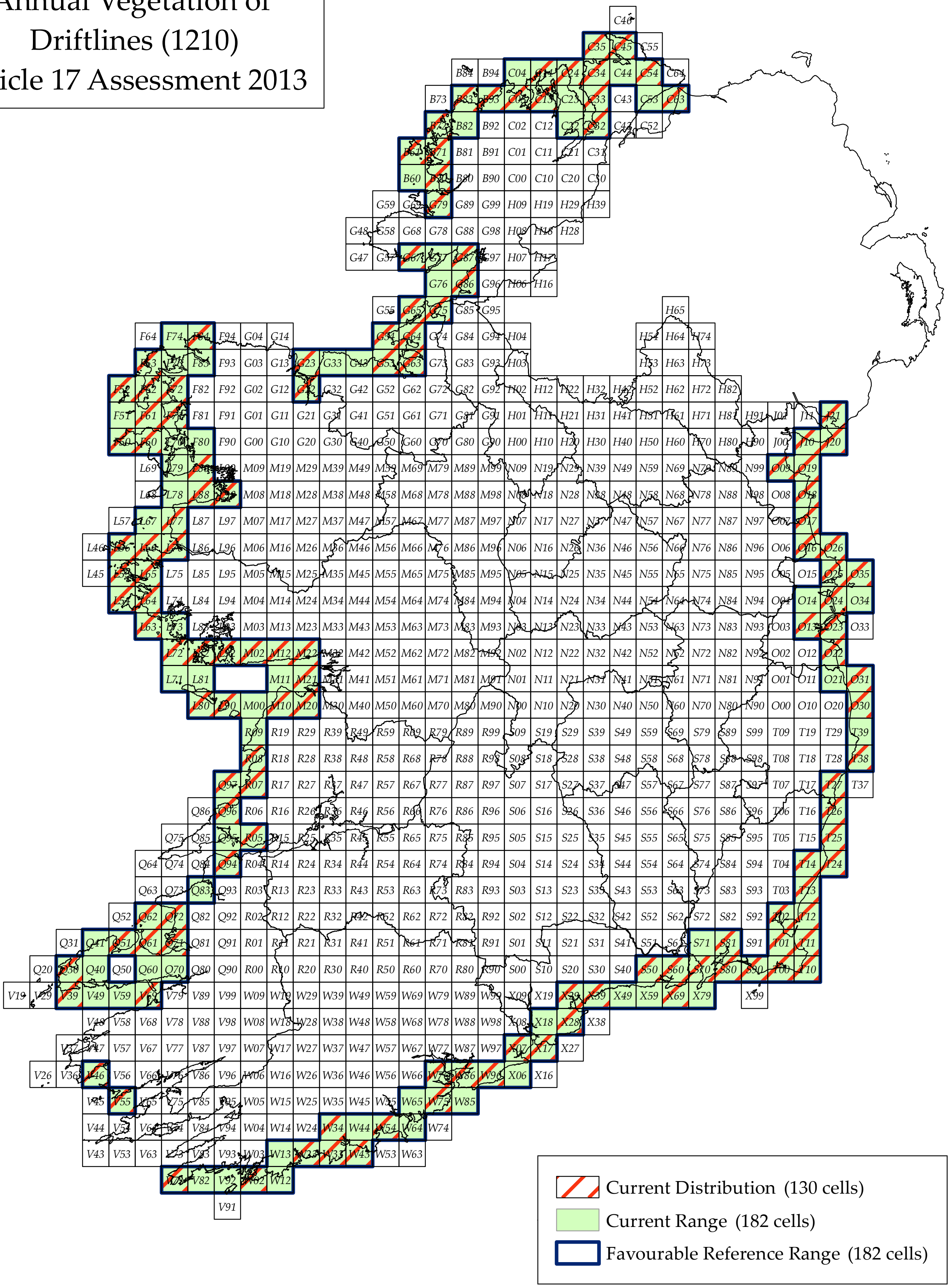
Field label	Note
Habitat code: 1210	
2.4.07 Short-term trend - Method used	Based on field surveys in 2004 - 2006 for the Coastal Monitoring Project and surveys of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012.
2.4.13 a) Reason for change - genuine change?	The Sand Dune Monitoring Project (Delaney et al., 2013) reported a genuine loss of 0.0009 km2, which was the direct result of anthropogenic activities, representing genuine permanent loss of habitat at two sites.
2.5 Main pressures	Expert judgement combined with the following procedure was used to rank pressures in terms of importance. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 1210 habitat nationwide were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. D03.01.02 piers / tourist harbours or recreational piers had an unknown area impacted on and therefore it should be kept in mind that this ranking of ‘Low importance (L)’ might be an underestimate of the pressure. SIR records agriculture and forestry activities not referred to and disposal of inert materials. The disposal of inert materials refers to dumping of dredged materials by Louth County Council which have since been removed and therefore were added to the pressures listed in section 2.5, but not to the threats in section 2.6 as it is expected that this will not continue to impact on the habitat into the next reporting period. It is unclear what the agricultural and forestry activities refer to, but they were recorded four times with both medium and low intensities affecting between 0.09-0.24 ha of habitat, which would give them Medium importance (M). They were recorded in section 2.5 under “A11 – Agricultural activities not referred to above”. Top ranking potential pressures from the Foreshore Deed Book included amenity/recreational pressures and coastal protection works for the most part, all of which are covered under the pressures listed.
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al. 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 1210 habitat were estimated by the surveyors on a site-by-site level. Negative impacts (pressures) were ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures (except for the J02.11.01 dumping, depositing of dredged deposits), the list is the same for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain coastal habitats. There is also likely to be an increased demand for coastal protection works in the future as a reaction to predicted sea level rise.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1

Field label	Note
Habitat code: 1210	
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess structure & functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least one of the species listed in 2.7.1, present in more than 40% of stops and another species present in more than 20% of stops.
2.7.04 Structure and functions - Methods used	Monitoring surveys were carried out at a sample of 19 sites where the habitat was found in 2011-2012 to assess structure and functions. In total, six criteria were considered in the structure and functions assessment. As well as typical species, presence of negative indicator species and non-native species were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 1210 within the sample. Structure and functions of the habitat were assessed as Favourable nationally if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.
2.7.05 Other relevant information	Structure and functions of 5.1% of the habitat were assessed as Unfavourable, with the remainder being assessed as Favourable. The most frequent criteria to fail the assessment were 'interference with sediment dynamics' and 'damage due to disturbance'.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Range is assessed as Favourable as there is no indication of loss since 2007.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Anthropogenic loss of 0.0009km2 was recorded during the SDM, which is equal to a loss of less than 1% per year since 2004. Reliable data for assessing area was not available for the period prior to 2004 (see 2.4.4).
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The reported loss of 0.0009 km2 is the direct result of anthropogenic activities at two sites.As these represent a permanent loss of habitat and indicate that the situation is declining.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure and functions of 5.1% of the habitat were assessed as Unfavourable, with the remainder being assessed as Favourable. This is consistent with an assessment of Unfavourable-Inadequate (see 2.7.4 for explanation of threshold values). The most frequent criteria to fail the assessment were 'interference with sediment dynamics' and 'damage due to disturbance'.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Area was assessed as Favourable in 2007, when only 1% of the habitat was considered to be in Unfavourable condition. A failure rate of 5.1% in this reporting period indicates that there has been a decline in the conservation assessment.

Field label	Note
Habitat code: 1210	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), future prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of the habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". 1210 has a total of 12 threats recorded by Delaney et al. (2013) and NPWS rangers. 1 was of "High importance (H)" and 6 were of "Medium importance (M)". Disturbance and interference with sediment dynamics are the main threats for this habitat. The presence of high and medium importance threats combined with the knowledge that there are no known measures on a national level, and few to no measures on a site level, in place to prevent problems associated with interference with sediment dynamics and disturbance suggests that the future trends for the range, area and structure and functions parameters are declining. As none of the parameters have borderline assessments however, none are predicted to decline to the extent that there will be a change in their future status. Future Prospects were therefore assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future Prospects were assessed as Unfavourable-Inadequate in the last reporting period. This assessment has not changed, and the assessment of the area and structure and functions is not expected to change in the foreseeable future, so the qualifier is stable.
2.8.05 Overall assessment of Conservation Status	Range was assessed as Favourable (stable) as there has been no change in the assessment since 2007. All of the other parameters were assessed as Unfavourable-Inadequate. Area was assessed as Unfavourable-Inadequate (declining) because losses continued to occur in the period 2004-2012, but the total loss of habitat recorded in 2011-2012 was considerably less than 1% per year since the Coastal Monitoring Project. Although this may seem insignificant it does represent a permanent loss of habitat. Structure and functions were assessed as Unfavourable-Inadequate (declining). 5.1% of the habitat were assessed as Unfavourable, with the remainder being assessed as Favourable. The most frequent criteria to fail assessed interference with sediment dynamics and damage due to disturbance. Future prospects were assessed as Unfavourable-Inadequate (stable). The most serious threats to the habitat were associated with recreation and coastal defences, and these were consistent with the structure and functions assessment results. Seven impacts of high and medium importance were recorded, and these impacts continue affect the habitat. There are expected to prevent the habitat from recovering at many sites, while they are likely to cause further deterioration at others. The overall conservation status of 1210 was assessed as Unfavourable-Inadequate in 2013.
2.8.06 Overall trend in Conservation Status	Because the area and structure and functions have declined since 2007, the overall trend is declining.

Field label	Note
Habitat code: 1210	
3.1.01 a) Surface area - Minimum	A shapefile containing the habitat polygons derived from the 1210 records from the 39 sites visited during the Sand Dunes Monitoring project (SDM) and the 1210 habitat polygons mapped at all of the other sites during the Coastal Monitoring Project (CMP) was created. The total area of 1210 within these polygons was 45.95 ha (0.46km2). This was intersected with the NPWS SAC shapefile. 0.17 km2 is included as a Qualifying Interest within an SAC, while 0.22 km2 is within and SAC but is not listed as a Qualifying Interest for the SAC.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value = max value.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring project (SDM) were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 1210 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas. The area mapped as part of the CMP and SDM is less than half of the total area believed to be present nationally. 181 sites were surveyed as part of the CMP, and these covered the vast majority of sand dune habitats associated with SAC's in Ireland. Most of the 1210 which was not included in the CMP is likely to be found adjacent to golf courses and other modified habitats which were not included in the CMP. These areas are generally outside of the SAC network in Ireland. Some drift line vegetation associated with large shingle banks within SA's may have been overlooked.
3.1.03 Trend of surface area within the network	Loss of habitat occurred within the SAC network.
3.2 Conservation measures	Anthropogenic impacts on the site would indicate that further measures are required that are currently not being implemented. In particular, implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial, particularly discouraging beach cleaning during the main strandline growth period. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. However, some measures are in place and have a beneficial effect.Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/) . Efforts have been made to restore some coastal areas after exploitation for agriculture or tourism, and these have had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion.

Annual Vegetation of Driftlines (1210) Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1220

NAME: Perennial vegetation of stony banks

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

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

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

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

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Packham, J.R., Randall, R.E., Barnes, R.S,K. and Neal, A. (eds.) (1999). Ecology and Geomorphology of Coastal Shingle. Westbury Academic & Scientific Publishing.

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service,Dublin.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	16800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	16800
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Habitats Directive came into force.
2.3.10 Reason for change	Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.97				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	stable (0)				
2.4.6 Short-term trend magnitude	min	0	max		confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	2			
	operator	N/A			
	unknown	No			
	method	The favourable reference area reported in 2007 was 2km2, which was estimated on the basis of the Coastal Monitoring Project (CMP) habitat maps and MPSU data, as well as records from the National Shingle Beach Survey (Moore and Wilson, 1999) and the Biomar survey of Irish Machairs (Crawford et al., 1996). As no new data sources for additional sites have since become available, the favourable reference area has not been adjusted.			
2.4.13 Reason for change	Genuine				

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
removal of beach materials (C01.01.02)	high importance (H)	N/A
pipe lines (D02.02)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A
Other forms of pollution (H07)	low importance (L)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
removal of beach materials (C01.01.02)	medium importance (M)	N/A
pipe lines (D02.02)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A
Other forms of pollution (H07)	low importance (L)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Beta vulgaris maritima

Cochlearia officinalis

Crithmum maritimum

Glaucium flavum

Honckenya peploides

Leymus arenarius

Potentilla anserina

Raphanus raphanistrum

Rumex crispus

Silene uniflora

Sonchus arvensis

2.7.2 Species method used: Species listed in 2.7.1 represent the selection of species that were deemed to provide the best indication of whether habitat was present and is not a comprehensive list of the typical species recorded here. The species were selected following a literature review, taking into account the species listed in

	the Interpretation Manual of European habitats, the JNCC guidelines, the National Shingle Beach Survey (Moore and Wilson, 1999), the Coastal Monitoring Project (Ryle et al., 2009) and relevés carried out in 2011 as part of the Sand Dunes Monitoring project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	The change in area since the assessment in 2007 is the result of the natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	As part of the monitoring programme for this habitat, typical species, presence of negative indicator species and non-native species were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. See Delaney et al. (2013) for full list of structure & functions criteria assessed. However, the Delaney et al (2013) was limited to sites associated with dune systems, so the assessment is based on data from marginal, beach fringing communities which are not necessarily subject to the same pressures and threats of large shingle bars. Therefore the current assessment is not fully representative of the 1220 habitat in Ireland. Based on data used to compile the distribution map it is estimated that approximately 50% of the national resource is located within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.2	max	1.2
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Inside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		low importance (L)	Both	Not evaluated
Restoring coastal areas (4.4)	Recurrent	low importance (L)	Inside	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	medium importance (M)	Outside	Enhance

Field label	Note
Habitat code: 1220	
0.2 Habitat code	This habitat occurs along the coast where shingle (cobbles and pebbles) and gravel have accumulated to form elevated ridges or banks above the high tide mark. Most of the rocky material should be less than 250mm in diameter to be considered in this category. The vegetation tends to be dominated by perennial species, typically including Honckenya peploides, Rumex crispus, Beta vulgaris ssp. maritima, Crithmum maritimum and Tripleurospermum maritimum. The rare plants Crambe maritima and Mertensia maritima are also associated with this community (Fossitt, 2000). Species diversity is determined by the degree of exposure and by substrate stability, coarseness and size. The presence of lichens indicates long term stability.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2009), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 1220 distribution map. Supplementary information was gathered from Foss et al. (2012) and the NPWS-Management Planning Support Unit Maps (1995-2009).
1.1.03 Year or period	Based on the list of sources used to generate the distribution map (1996 to 2012).
1.1.04 Additional distribution map	1220 polygons from various data sources (see section 1.1.2) were intersected with the ING 10 square grid to determine the national grid distribution. The distribution covered 113 10km2 grid squares. A comparison with the distribution map submitted in 2007 reveals that two grid squares were added to the distribution and five grid squares were los. These changes are due to improved knowledge from survey work (Foss et al., 2012; Delaney et al., 2013) and natural fluctuations as a result of the highly ephemeral nature of the habitat.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. A set of 13 cells generated by the range tool was removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. Guidelines for future monitoring were also developed. The survey included perennial vegetation of stony banks where it was found to occur in association with sand dunes. It was recorded at a total of 49 Sites. Delaney et al. (2013) monitored a subset of these sites, including 7 sites that were reported to support 1220, and further refined the methodology for monitoring. However, as both of these surveys were confined to sand dune systems they are not representative for the national resourse of vegetated shingle. Therefore information from the National Shingle Beach Survey (Moore and Wilson, 1999), Biomar Survey of Irish Machair (Crawford et al., 1996) , Louth Wetland Survey (Foss et al. 2012) and information collected by the Conservation Planning Unit of the NPWS were used to compliment this data in determining the distribution of the habitat. Gaynor (2008) and Packham et al. (1999) provided additional background information on the nature of the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Pressures and threats noted in Moore and Wilson (1999) that are assumed to be continuing were also used in section 2.5. Implications of climate change were derived from Farrell (2009), as well as Fealy and Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.

Field label	Note
Habitat code: 1220	
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2009), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 1220 distribution map. Supplementary information was gathered from Foss et al. (2012) and the NPWS-Management Planning Support Unit Maps (1995-2009). The range tool was applied to the distribution map. The final range map was edited after consultation with the NPWS sand dunes expert, Dr. Karen Gaynor. A set of 13 cells generated by the range tool was removed from the range map as these cells do not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: “The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this”.
2.3.04 Short term trend - Trend direction	The previous range was 15,200km². The increase in range is primarily due to the use of the new range tool and partly due to changes in the distribution map (see 1.1.4).
2.3.09 a) Favourable reference range - In km2	There is no indication that there has been any anthropogenic loss of range since implementation of the Habitats Directive.
2.3.10 a) Reason for change - genuine change?	See 2.3.4.
2.4.01 Surface area	The surface area reported in 2007 was 2km2, which was estimated on the basis of the Coastal Monitoring Project (CMP) habitat maps, MPSU data and records from the National Survey of Shingle Banks (Moore and Wilson 1999) and the Biomar survey of Irish Machairs (Crawford et al. 1996). No new data sources have become available to identify additional sites or suggest that this figure should be increased. When a sample of thirty-nine of the CMP sites were revisited as part of the Sand Dunes Monitoring project (SDM), 1220 was found and mapped at 14 sites. It was found that in some cases, drift line vegetation on shingle was misclassified as 1220 during the CMP. The area affected was small (0.0057 km2). Because the surface area quoted in 2007 was based mainly on extrapolation and estimation, with very little of the habitat covered by ground surveys, revising the surface area quoted in the 2007 assessment in the absence of any new data would be meaningless. Where the habitat was found during the SDM and after adjusting the figures to account for overestimation in the CMP, the area was found to have decreased at three sites by a total of 0.03km2, which was entirely due to natural processes. The change in area is not consistent across all sites, so the change was not extrapolated to the area of the habitat which was not visited. The current surface area was calculated by subtracting the area lost within the sample (0.03km2) from the total area reported in 2007 (2.00ha).
2.4.02 Year or period	Field surveys were carried out at 181 dune sites between 2004 and 2006 as part of the Coastal Monitoring Project and follow up surveys were carried out at a sample of 39 of these sites between 2011 and 2012 as part of the Sand Dunes Monitoring project. However,perrennial vegetation of stony banks was only recorded at 14 of these sites, which are all associated with dune systems.

Field label	Note
Habitat code: 1220	
2.4.04 Short-term trend - Period	Although no loss was recorded during the Sand Dunes Monitoring project, loss was reported during the Coastal Monitoring Project and Area was assessed as Unfavourable-Inadequate during reporting in 2007. There is no indication that any of the habitat which was lost has been restored, but no further loss has been observed. The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). It is not possible to estimate the amount of loss which occurred in the years between 2001 and 2004 from the information provided in the backing documents or Coastal Monitoring Project report (Ryle et al. 2009).
2.4.05 Short-term trend - Trend direction	The change in area since the assessment in 2007 is the result of natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status.
2.4.06 a) Short-term trend - Magnitude - Minimum	No loss due to human activities was recorded, so area of loss is equal to zero. There has been some natural loss due to erosion and succession, but these are not included in the area assessment.
2.4.07 Short-term trend - Method used	Based on field surveys in 2004 - 2006 for the Coastal Monitoring Project and surveys of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012.
2.4.13 a) Reason for change - genuine change?	See 2.4.5
2.5 Main pressures	The main sources of data were Delaney et al (2013), Ryle et al (2009), Moore and Wilson (1999), the SIR database and the Foreshore Deed Book. Expert judgement combined with the following procedure was used to rank pressures in terms of importance. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 1220 habitat nationwide were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. SIR records sand and gravel extraction, removal of beach materials, disposal of inert materials, energy transport: pipe lines, other forms or mixed forms of pollution, landfill, land reclamation and drying out and coastal protection works as pressures for 1220. The majority of these pressures are only recorded once, apart from sand and gravel extraction which was recorded three times, and other forms or mixed forms of pollution, which was recorded twice. Top ranking potential pressures from the Foreshore Deed Book included amenity/recreational pressures and coastal protection works for the most part, all of which are covered under the pressures listed.

Field label	Note
Habitat code: 1220	
2.5.01 Method used - pressures	Actual impact data from the sand dune monitoring project survey of 2011-2012 (Delaney et al. 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 1220 habitat were estimated by the surveyors on a site-by-site level, although this only applied to a small number of sites all of which are associated with dune systems. Negative impacts (pressures) were ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits. Those pressures identified in the National Shingle Beach Survey (Moore and Wilson 1999) that are assumed to be continuing were also included.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures, the list is the same for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain vegetated shingle habitats. There is also likely to be an increased demand for coastal protection works in the future as a reaction to predicted sea level rise.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess structure and functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least two species present in more than 60% of stops and two other species listed in 2.7.1 present in more than 40% of stops or, for the more naturally species-poor beach-fringing communities, at least two species present in more than 40% of stops and one other species present in more than 20% of stops.

Field label	Note
Habitat code: 1220	
2.7.04 Structure and functions - Methods used	Monitoring surveys were carried out at a sample of 9 sites that supported the habitat 1220 in 2011-2012 (Delaney et al., 2013), though it must be highlighted that this was restricted to dune systems and so is not fully representative of the habitat. In total, six criteria were considered in the structure and functions assessment. As well as typical species, presence of negative indicator species and non-native species were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also considered. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 1220 within the sample. Structure and functions of the habitat were assessed as Favourable nationally if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.
2.7.05 Other relevant information	More than 93% of the habitat was assessed as Favourable for Structure and functions, with only 6.9% assessed as Unfavourable. The most frequent criteria to fail the assessment were 'interference with sediment dynamics' and 'damage due to disturbance'.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range was taken to be the favourable reference range is there is no indication that it has declined since designation and it is adequate to conserve the diversity of the habitat within Ireland.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	No anthropogenic loss was noted in 2011-2012 (Delaney et al, 2013). However, habitat loss occurred between implementation of the Habitats Directive and 2007, and there is no evidence that habitat restoration works have been carried out to redress this. Area was therefore assessed as Unfavourable-Inadequate.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	There has been no further documented loss since reporting in 2007, and the trend is stable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	6.9% of the habitat area within the sample was assessed as being in Unfavourable condition, which is consistent with an assessment of Unfavourable-Inadequate. The structure and functions assessment was based on data from the Sand Dunes Monitoring project (SDM), which was limited to sites associated with dune systems and did not include large shingle banks. The results of the National Survey of Shingle Beaches (NSBS) would indicate that the structure and functions of the habitat are affected by more negative impacts than were picked up in the SDM or Coastal Monitoring Project (CMP) assessments.

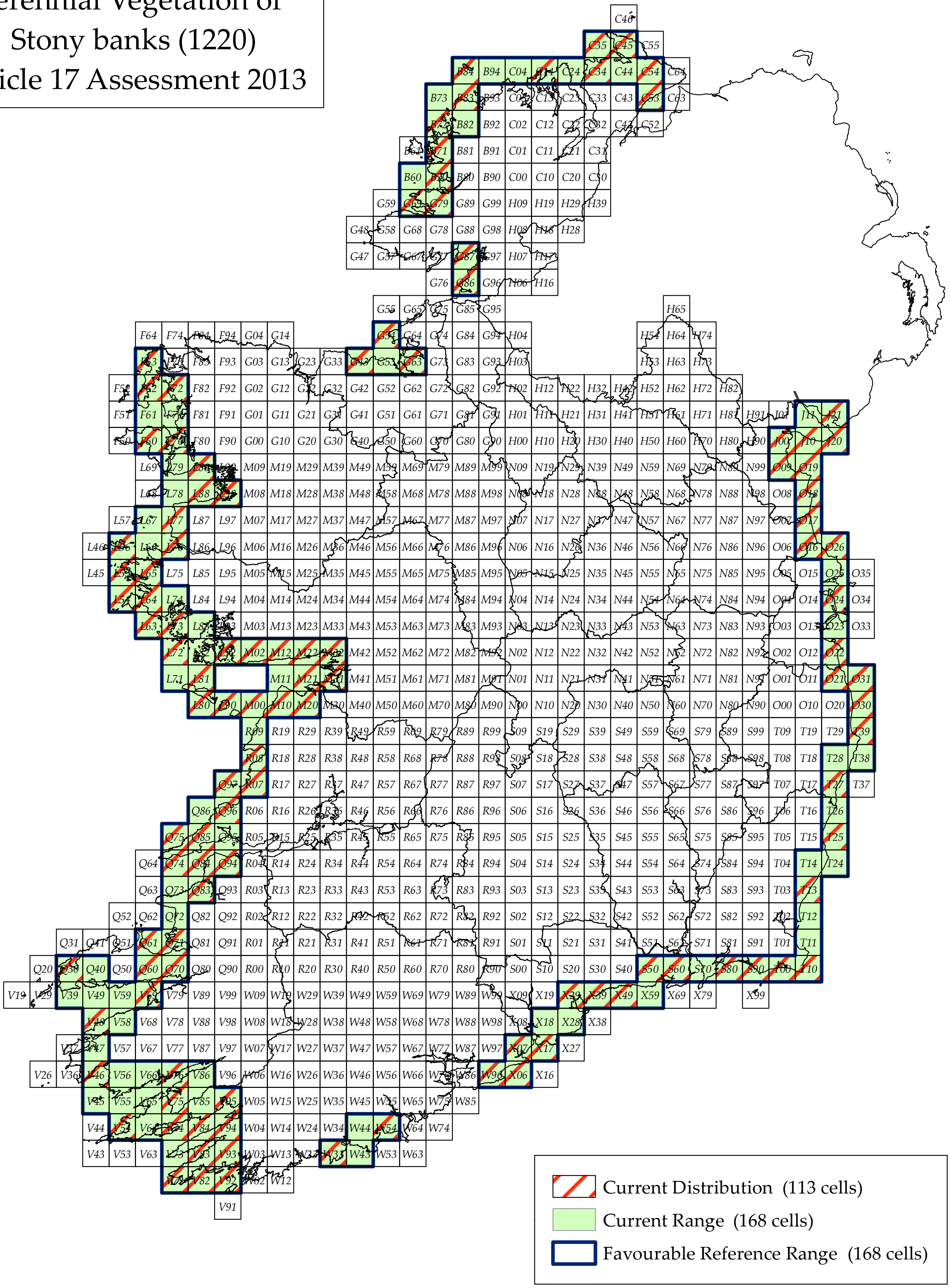
Field label	Note
Habitat code: 1220	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Habitat assessments were carried out at 49 sites during the Coastal Monitoring Project. Structure and Functions were assessed as Unfavourable at 11 of these sites (18.7%). During the Sand Dunes Monitoring project, structure and functions were assessed as Unfavourable-Inadequate at two of nine sites where the habitat was assessed (22%). The habitat is not considered to have deteriorated significantly since the assessment in 2007 and trend is stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". 1220 has a total of 11 threats recorded by Delaney et al. (2013) and NPWS rangers. Many of the pressures and threats identified in Moore and Wilson (1999) are also on-going. Disturbance and interference with sediment dynamics are the main threats for this habitat. There are no known measures on a national level in place, and few to no measures on a site level, to prevent problems associated with interference with sediment dynamics and disturbance. This suggests that the future trends for the range, area and structure and functions parameters are declining. As none of the parameters have borderline assessments however, none are predicted to decline to the extent that there will be a change in their future status. Future prospects were therefore assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future Prospects were assessed as Unfavourable-Inadequate in the last reporting period, and as there has been no change in the assessment in this reporting period, the qualifier is stable.

Field label	Note
Habitat code: 1220	
2.8.05 Overall assessment of Conservation Status	The current range was taken to be the favourable reference range as there is no indication that it has declined since designation and it is adequate to conserve the diversity of the habitat within Ireland. Range was therefore assessed as Favourable. Area was assessed as Unfavourable-Inadequate (stable) because no loss was recorded in the period 2004-2012, but loss of habitat equal to less than 1% per year has occurred since implementation of the Habitats Directive. Structure and functions were assessed as Unfavourable-Inadequate (stable). 6.9% of the habitat were assessed as Unfavourable, with the remainder being assessed as Favourable. The most frequent criteria to fail assessed interference with sediment dynamics and damage due to disturbance. Future prospects were assessed as Unfavourable-Inadequate (stable). The most serious threats to the habitat were associated with recreation and coastal defences, and these were consistent with the structure and functions assessment results. Six impacts of high or medium importance were recorded and these impacts continue to affect the habitat. One of the parameters was assessed as Favourable, and the remaining three were assessed as Unfavourable-Inadequate. The conservation status of 1220 was therefore assessed as Unfavourable-Inadequate. The assessment was based on marginal sites associated with sand dune systems, and did not include large shingle banks. A more comprehensive assessment of shingle systems is required in the future to give a more reliable account of the total national resource and the conservation status of the habitat.
2.8.06 Overall trend in Conservation Status	There has been no change in the conservation assessment of any of the parameters since reporting in 2007, and trend was assessed as stable.
3.1.01 a) Surface area - Minimum	Only confirmed mapped habitat polygons were used in this calculation. The habitat maps generated during the Sand Dunes Monitoring Project (Delaney et al, 2013) were combined with the habitat maps for all other known sites mapped during the Coastal Moitoring Project (Ryle et al., 2009). The resulting shapefile was intersected with the latest NPWS SAC shapefile to establish the minimum confirmed area. According to this method, as area of 0.2km2 of 1220 was located within the SAC network. 0.15 km2 is included as a Qualifying Interest within an SAC, while 0.05 km2 is within an SAC but is not listed as a Qualifying Interest for the SAC. However, the known mapped areas of this habitat are restricted to sites associated with dune systems and are do not include the large shingle beach sites, they are not fully representative of the habitat. Consequently this figure is likely to be underestimated.

Field label	Note
Habitat code: 1220	
3.1.01 b) Surface area - Maximum	All potential records of this habitat that were used to derive the distribution map, including polygon and point data were used in this calculation. When the polygon shapefile used to calculate the distribution of the habitat is intersected with the NPWS SAC shapefile, the area of 1220 within the Natura 2000 network is 1.12 km2. Of this, 1.07 km2 is protected as a QI and 0.05 km2 is not listed as a QI for the SACs where it occurs. 81 points in the point distribution file for 1220 are located within SACs. 22 of these are in sites where 1220 is listed as a QI, and this corresponds to approximately 0.02 km2. 59 points are present in SACs where 1220 is not listed as a QI. This is equal to approximately 0.06 km2. Combining the polygon and point data analyses gives a total area of 1.2km2 (1.12 + 0.08km2), of which 1.09km2 is protected as a Qualifying Interest (QI), while 0.11km2 is within he network but not listed as a QI for the SAC in which it occurs.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring project (SDM) were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 1220 had been recorded and mapped within SAC boundaries. The figure presented in 3.1.1a is the sum of all of those areas and therefore represents the known area as confirmed by field surveys and therefore the absolute minimum area. Combining the polygon and point data used to derive the distribution map gives a more complete record of the habitat, bearing in mind that some of this data is from older sources that have yet to be confirmed in the field. When intersections between the distribution polygon and point shapefiles and the SAC shapefile were carried out and additional 81 points representing the habitat were found to be located within SACs. In the absence of area data for point features, the mean area of polygons in the polygon distribution shapefile for 1220 was used as a substitute area for the distribution points. 48 of the points represent sites recorded during the National Survey of Shingle Banks (Moore and Wilson, 1999), and many of these undoubtedly represent larger areas than were recorded during the CMP or SDM. In view of the above, both the Min and Max figures should be treated with caution.
3.1.03 Trend of surface area within the network	No loss as a result of anthropogenic impacts was recorded between the Coastal Monitoring Project (2004-2006) and the Sand Dunes Monitoring project (2011-2012).

Field label	Note
Habitat code: 1220	
3.2 Conservation measures	Anthropogenic impacts on the site would indicate that further measures are required that are currently not being implemented. In particular, implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Areas of shingle habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. However, some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/) . Efforts have been made to restore some coastal areas after exploitation for agriculture or tourism, and these have had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion.

Perennial Vegetation of Stony banks (1220) Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1230

NAME: Vegetated sea cliffs of the Atlantic and Baltic Coasts

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2003-2005
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published:

Barron, S.J., Delaney, A., Perrin, P.M., Martin, J.R. and 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, Ireland.

Browne, A. (2005). National inventory of sea cliffs and coastal heaths. Report for the National Parks and Wildlife Service, Dublin.

MERC/EIRECO (2009) Survey plan to assess the conservation status of Irish sea cliffs. An unpublished report to the National Parks and Wildlife Service.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	24000	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	24000
	operator	N/A
	unknown	No
	method	As there is no evidence to suggest a decline in range since the Directive came into force, the range derived from the distribution given in Barron et al. (2011) is set as the Favourable Reference Range.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	2159				
2.4.2 Year or period	2003-2005				
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.4 Short-term trend period	2001-2011				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.03	max	1	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				

2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	2159
	operator	N/A
	unknown	No
	method	The value given is length in km. Although some minor losses were observed, the FRA is set as the current area. A very small proportion of the resource was surveyed in the field and the possibility of the revegetation of old landslides has not been realised. Area or length of habitat may be lost but the stretch of sea cliff may still exist.
2.4.13 Reason for change	Improved knowledge/more accurate data	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	medium importance (M)	N/A
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
sea-level changes (M01.07)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	low importance (L)	N/A
railway lines, TGV (D01.04)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
Discharges (E03)	low importance (L)	Mixed pollutants (X)
disposal of household / recreational facility waste (E03.01)	low importance (L)	Mixed pollutants (X)
disposal of industrial waste (E03.02)	low importance (L)	Mixed pollutants (X)
Structures, buildings in the landscape (E04)	low importance (L)	N/A
Other urbanisation, industrial and similar activities (E06)	low importance (L)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	Mixed pollutants (X)
collapse of terrain, landslide (L05)	medium importance (M)	N/A
flooding and rising precipitations (M01.03)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	medium importance (M)	N/A
sand and gravel quarries (C01.01.01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
sea-level changes (M01.07)	medium importance (M)	N/A
non intensive sheep grazing (A04.02.02)	low importance (L)	N/A
railway lines, TGV (D01.04)	low importance (L)	N/A
slipways (D03.01.01)	low importance (L)	N/A
piers / tourist harbours or recreational piers (D03.01.02)	low importance (L)	N/A
Discharges (E03)	low importance (L)	Mixed pollutants (X)
disposal of household / recreational facility waste (E03.01)	low importance (L)	Mixed pollutants (X)
Structures, buildings in the landscape (E04)	low importance (L)	N/A
Other urbanisation, industrial and similar activities (E06)	low importance (L)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	Mixed pollutants (X)
collapse of terrain, landslide (L05)	medium importance (M)	N/A
flooding and rising precipitations (M01.03)	medium importance (M)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Verucaria maura
Ramalina spp.
Xanthoria spp.
Crithmum maritimum
Caloplaca spp.
Armeria maritima
Plantago maritima
Anthyllis vulneraria
Festuca rubra
Agrostis stolonifera
Calluna vulgaris
Lonicera periclymenum
Silene uniflora
Tussilago farfara
Daucus carota
Equisetum spp.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Erica cinerea

Ulex gallii

2.7.2 Species method used	161 releves were recorded from 62 sea cliff sections (Barron et al. 2011). The main species for the groups identifed following vegetation analysis were augmented with species typical of soft cliffs and coastal heath as these habitats were under-represented in the dataset.
2.7.3 Justification of % - thresholds for trends	Although minor losses in extent were recorded these were considered negligible and could be as low as 0.03% per annum. The field survey captured approximately 5% of the national resource, therefore it is difficult to determine whether there has been recovery of previously compromised cliff vegetation.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Sea cliffs are present in 80 SACs but only 28 SACs where the habitat is listed as a Qualifying Interest.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	990	max	1067
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring coastal areas (4.4)	One-off	low importance (L)	Inside	Enhance
Legal protection of habitats and species (6.3)	Legal	medium importance (M)	Both	Enhance
Measures needed, but not implemented (1.2)	Recurrent One-off	medium importance (M)	Both	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 1230	
0.2 Habitat code	The following definition was developed by Barron et al., 2011): "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 substrate such as shale or boulder clay. Hard cliffs are at least 5m high, while soft cliffs are at least 3m high. The cliff top is generally defined by a change to an obvious less steep gradient. In some cases the cliff may grade into the slopes of a hillside located close to the coast. In these cases the cliff is defined as that part of the slope which was formed by processes of coastal erosion, while the cliff top is where there is the distinct break in slope. Both the cliff and the cliff top may be subject to maritime influence in the form of salt spray and exposure to coastal winds. A cliff can ascend in steps with ledges, and the top of the cliff is taken to occur where erosion from wave action is no longer considered to have been a factor in the development of the landform. The cliff base may be marked by a change in gradient at the bottom of the cliff. Where the base is exposed it can be characterised by scree, boulders, a wave-cut platform or sand, among other substrates. During this survey, where cliffs occur within the subtidal zone the base was considered to be the high water mark. A cliff is considered to have reached its end point where it is no longer over 5m high (hard cliffs) of 3m high (soft cliffs), or no longer has a steep slope. To be considered in this study, a cliff had to be a minimum of 100m in length. Sea cliffs may support a range of plant communities such as grassland, heath, scrub and bare rock communities, among others."
1.1.02 Method used - map	Barron et al. (2011) and Browne (2005) were used as the basis for the distribution map for 1230 vegetated sea cliffs. Oblique photographs, derived from video imagery captured in 2003, were examined by Barron et al. (2011) to draw up a list of 'potential sea cliffs'. Physical characteristics were further assessed using aerial photographs (2005 series) and OSI Discovery Series maps, information on soils from Teagasc soil and parent material maps, and information on bedrock from the Geological Survey of Ireland bedrock maps. The resulting sea cliff locations were transferred to the County boundary line developed from OSI six inch maps of Ireland. A further 10 cliffs, identified by Browne (2005), for which no remote imagery was available are included in the distribution. These are referred to as 'undocumented sites'.
1.1.03 Year or period	The Browne (2005) inventory, the 2003 oblique photographs and the 2005 aerial photographs were examined by Barron (2011). Therefore the period given is 2003-2005. It is important to note that Browne (2005) collated all available historic data, therefore the 10 sites with no imagery are based on older data.
1.1.04 Additional distribution map	1230 records from various sources (see section 2.2) were intersected with the Irish 10 km grid to determine the national grid distribution. The habitat was present in 205 grid cells. A comparison with the distribution map generated in 2007 shows that 1230 was found in 52 new grid cells due to improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool.

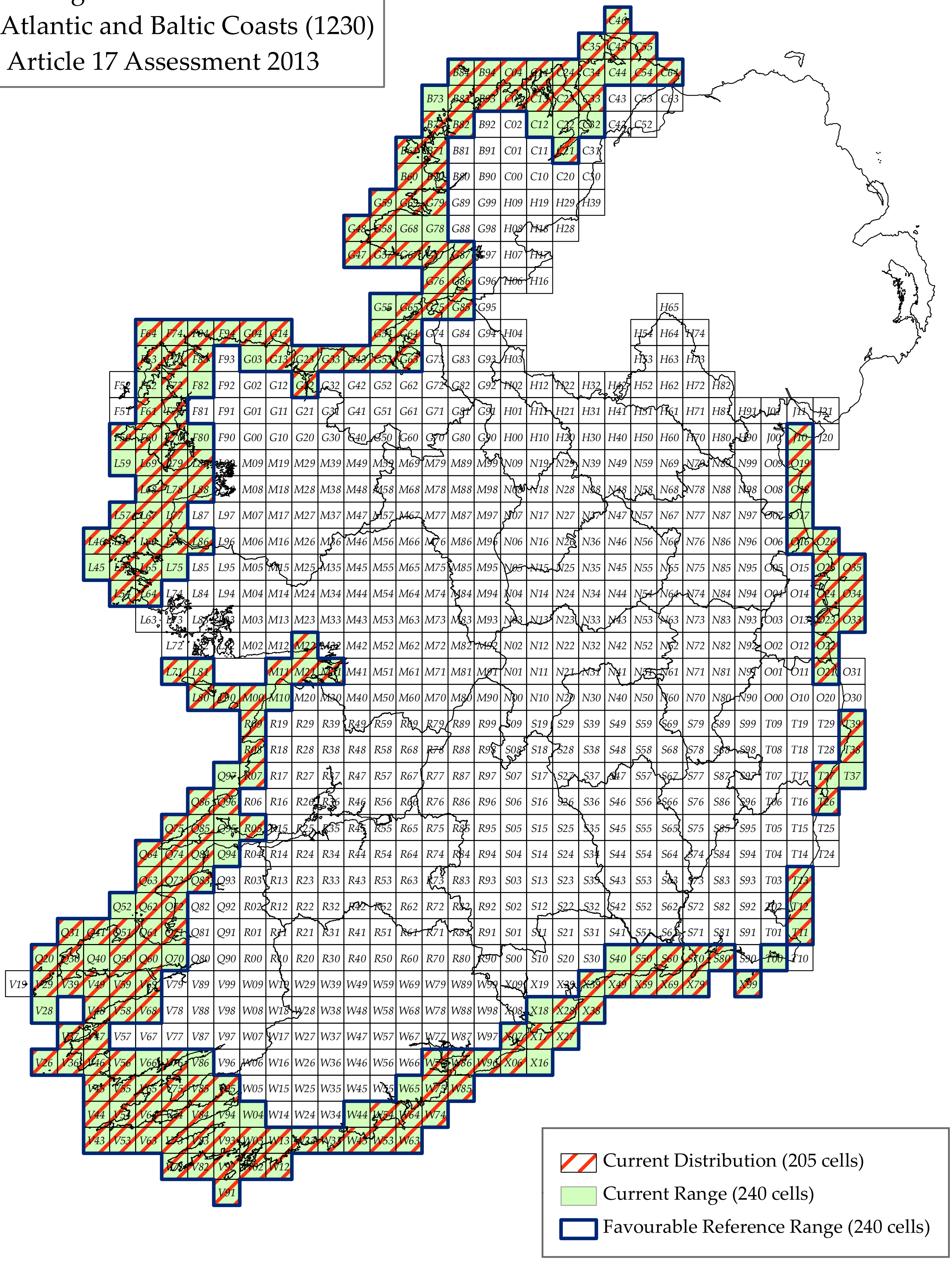
Field label	Note
Habitat code: 1230	
2.2 Published sources	A National inventory of sea cliffs and coastal heaths (Browne 2005) collated existing information on sea cliffs in Ireland, including what was known of their vegetation. As part of that study, the likely locations of cliffs on the Irish coast were drawn on a set of OSI Discovery Series maps. These were later digitised using ArcGIS. Browne (2005) identified 140 "potential coastal heath and cliff sites". Sites were identified primarily using Discovery Series maps and, by eye, viewing the close nature of the contour lines. Additional sources used included NPWS conservation site information and an inventory of cliff nesting seabirds. As stated in Browne (2005), only sites greater than 10 m in height were identified through this process. A pilot survey was conducted by MERC/EirEco (2009). The primary focus of this study was to develop a methodology for surveying Irish sea cliffs, and to develop a conservation assessment protocol. A desk survey of 20 sites was completed and information compiled in a database. Survey work was trialled at five sites. The survey work tested proposed survey methodologies which were evaluated and presented in the pilot survey report. Barron et al (2011) built on the pilot survey undertaken by MERC/EirEco (2009). A desk study was undertaken on 196 sea cliff sites. Factors such as structure, vegetation and anthropogenic influences were investigated using aerial photographs, oblique photographs of the coast and a range of GIS data. An additional 140 sea cliff sites were provisionally identified during this project but have not been fully investigated. Field studies were carried out at a sub-sample of 32 sites; five of these were surveyed using rope survey techniques. Data were collected from swaths at 62 sea cliff sections with a total of 161 relevés recorded. Remote survey techniques were utilised at all sites, using high powered photographic equipment to take photographs of relevés with species lists being developed at a later date by a botanist. Criteria for assessing area, structure & functions and future prospects were developed and the 32 field sites were assessed. Data from Barron et al. (2011) was used to complete this national assessment.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	The explanation for this field is covered in 1.1.2 and 1.1.4.
2.3.03 Short-term trend - Period	Although maps and imagery from 2003-2005 were examined and field surveys undertaken in 2008-2010; the default 2001-2012 trend period was used as there is no evidence of a decline in range in this time frame, particularly if NPWS site files are consulted (note- these site files date back to the early-mid 1990s).

Field label	Note
Habitat code: 1230	
2.4.01 Surface area	The figure given is length in km. 2,159 km is the total length of cliffs recorded by Barron et al. 2011. This includes sites fully reviewed (1,522 km); those identified in a previous study (Browne 2005) for which no remote imagery was available and hence have not been fully reviewed (43 km) and sites provisionally identified by Barron et al. (2011) which have not, to date, been fully reviewed (186 km). The lengths given for cliffs which have not been fully reviewed may change following detailed investigation. The method of determining the location of cliff sites is given above in section 1.1.2. It should be noted that although the best available data was used in determining the length of cliffs, a comparison was made in Barron et al. (2011) to determine the accuracy of the County boundary line when compared to the line digitised from the 2005 ortho-rectified aerial photographs. Two sections of coast were investigated. For the south Wexford coast the two datasets (the County boundary line and the digitised line) were relatively consistent, being within 8% of each other. The discrepancy between the datasets for the Dingle Peninsula was however 28%, reflecting the more indented structure of this section of coastline. These discrepancies reflect the indentations on the coast which the County boundary line is simply not accurate enough to depict. If a third of the country represents a less indented coastline and two-thirds a more indented coastline then the length estimate could be adjusted upwards to 2125 km. Due to the difficulties in representing vertical or near vertical habitat using traditional mapping methods the length of cliff habitat was used through the project rather than the area. If the total length of cliff recorded is 1,751 km, an approximate area can be calculated from the median slope distance of sites surveyed (0.0254 km) and the total length of cliffs (1,751 km) as 44.5 km^2.
2.4.02 Year or period	See 1.1.3
2.4.03 Method used - Area covered by habitat	See 1.1.2
2.4.04 Short-term trend - Period	The default 2001-2012 trend period is used, however it is difficult to say exactly when all the losses in habitat occurred or whether these losses were balanced by natural revegetation of undocumented landslides.
2.4.05 Short-term trend - Trend direction	Of the 32 sites surveyed in the field by Barron et al. (2011), losses in habitat extent were noted at 3 sites. A further loss of habitat resulting from a landslide was reported in the national media in 2012.
2.4.06 a) Short-term trend - Magnitude - Minimum	1% loss of habitat has been estimated from 32 sites in Barron et al. (2011) and the 0.4 km loss reported in the national media in (2012). Sea defenses caused losses at 2 sites and gravel extraction from one site. The sea defenses and quarrying have been ongoing since the Directive came into force, however it is not clear whether most of these losses occurred in the last 12 years. If the quarrying occurred prior to 2000 then the loss of habitat is estimated at 0.3%. These observations are based on a very minor proportion of the national resource and should be treated with caution.
2.4.06 b) Short-term trend - Magnitude - Maximum	This value refers to the maximum 1% value explained in 2.4.6 a).
2.4.12 a) Favourable reference area - In km2	The value given is length in km. Although some minor losses were observed the FRA is set as the current area. A very small proportion of the resource was surveyed in the field and the possibility of the revegetation of old landslides has not been realised. Area or length of habitat may be lost but the stretch of sea cliff may still exist.

Field label	Note
Habitat code: 1230	
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The examination of oblique photographs taken in 2003 and aerial photographs taken in 2005 by Barron et al. (2011) resulted in a refined distribution and range from that derived from Browne (2005).
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The 2007 data derived from Browne (2005) was based largely on the assessment of contours. Barron et al. (2011) utilised oblique imagery of the coast and mapped sites to the OSI 6" County boundary thus improving the estimation of the length of coastline.
2.5.01 Method used - pressures	Barron et al. (2011) recorded all activities impacting the sea cliff habitat at 32 sites. The impacts were rated as High, Medium or Low. Impact of note: Paths were recorded as negatively impacting 12 sites; 6 at medium intensity and 6 at low intensity. Invasive plants were recorded at 7 sites at a mixture of intensities. Sea defenses were recorded at 8 sites at mainly medium and high intensity. Sea level rise was noted at 10 sites at a low intensity. Pressures will become a major problem where they have an additive effect that would undermine the structure of the cliff e.g. grazing in combination with paths and sea defences. It is unclear whether the recent landslide reported at one site in 2012 is due to natural process or climate change resulting in rising precipitation.
2.6.01 Method used - Threats	As there is no evidence of a decline in any of the current pressures the list is the same for threat. The intensity of quarrying has been reduced to low as there is unlikely to be any extensive quarrying works. The intensity of sea level rise has been increased to medium to fall in line with climate change projections.
2.7.04 Structure and functions - Methods used	Assessment criteria were developed by Barron et al. (2011), these include sea defences, access points and vegetation indicators assessed by community type.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Vegetated sea cliffs are widely dsitributed along the coastline of Ireland, with some natural discontinuities on the east coast. There has been no change in Range since the Directive came into force or from historic times, therefore Range is assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Approximately 346 sea cliff sites have been documented (although 140 of these still need to be verified), covering an extent of at least 1751 km. Apart from very minor losses due to quarrying, landslides and sea defenses there has been no recent changes in the extent of sea cliffs in Ireland, therefore Area has been assessed as Favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	62 sections of sea cliffs at 32 sites were surveyed in the field and assessed using criteria developed by Barron et al. (2011). 18 sites were assessed as Favourable, 10 as Unfavourable-Inadequate and 4 as Unfavourable-Bad. Approximately 11% of the cliff surveyed was considered to be in poor condition, therefore Structure & functions are assessed as Unfavourable-Inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Barron et al (2011) completed the first major assessment of the Structure & functions of sea cliffs. It was difficult to determine what optimum quality should be for this habitat type and many of the targets set may be refined following future monitoring. The pressures impacting on the sea cliffs are unlikely to have escalated in the recent past and positive management measures to control invasive species at some site will improve the quality at these sites in the future, therefore the Structure & Functions qualifier has been set as stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The impacts recorded by Barron et al. (2011) at 32 sites were used to assess Future prospects at each site; 19 were assessed as Favourable and 13 as Unfavourable-Inadequate. Therefore Future prospects has been assessed as Unfavourable-Inadequate.

Field label	Note
Habitat code: 1230	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Threats such as sea level rise and impacts relating to infrastructure, particularly on the east coast may become more of an issue in the future. Efforts to clear invasive species at several sites should improve the quality of many sites. Therefore the future prospects qualifier has been set as stable.
3.1.01 a) Surface area - Minimum	This value is in km. The value is derived from the intersection of the SAC GIS layer with the confirmed and potential resource in Barron et al. (2011).
3.1.01 b) Surface area - Maximum	This value is in km. The value given in 3.1.1 a) is corrected for a more detailed coastline assuming two-thirds of Ireland is more indented (see 2.3.3)
3.1.03 Trend of surface area within the network	The results from Barron et al. (2011) demonstrate that the number of sites in SACs which were assessed as Favourable was almost equal to the number of sites in SACs which received an Unfavourable assessment. Though the numbers surveyed are quite small, particularly for sites outside of SACs, 50% of sites coinciding with or outside SACs were assessed as favourable. Only one site (5%) coinciding with a SAC received the score Unfavourable - Bad, while 3 sites (30%) of those outside of SACs were assessed as Unfavourable - Bad. It is unlikely that there is a difference in trend inside or outside the network therefore an overall trend of stable is given to reflect the overall assessment, this should be treated with caution however due to the small sample size.
3.2 Conservation measures	Vegetated sea cliffs listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Vegetated sea cliffs is regulated under the Environment Liability Regulations 2008. An eradiaction programme for Hottentot fig on the cliffs in Howth head was completed in 2011 by the National Botanic Gardens.

Vegetated sea cliffs of the Atlantic and Baltic Coasts (1230) Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Map - Léarscáil
V 1.0
Date - Dáta
05-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1310

NAME: Salicornia and other annuals colonizing mud and sand

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2009
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Adam, P. (1990). Saltmarsh ecology. Cambridge University Press, London.

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The Salt Marshes of Ireland: An Inventory and Account of their Geographical Variation. Biology and Environment: Proceedings of the Royal Irish Academy 98B, 87-104.

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Davy, A.J, Bishop, G.F, and Costa, C.S.B. (2001). Biological Flora of the British Isles: Salicornia L. (Salicornia pusilla J. Woods, S. ramosissima J. Woods, S. europaea L., S. obscura P.W. Ball & Tutin, S. nitens P.W. Ball & Tutin, S. fragilis P.W. Ball & Tutin and S. dolichostachya Moss). Journal of Ecology 89, 681–707.

Fahy, E., Goodwillie, R., Rochford, J.and Kelly, D. (1975). Eutrophication of a partially enclosed estuarine mudflat. Marine Pollution Bulletin 6, 29-31.

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Fealy, R. and Murphy, C. (2009). The likely physical impacts of future climate change on inland waterways and the coastal environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

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JNCC (2004). Common Standards Monitoring Guidance for saltmarsh habitat. JNCC, Peterborough.

Loebl, M., van Beusekom, J. and Reise, K. (2006). Is spread of the neophyte Spartina anglica recently enhanced by increasing temperatures? Aquatic Ecology

30 (3), pp 315-324.

Long, S.P. (1990). The primary productivity of Puccinellia maritima and Spartina anglica, a simple predictive model of response to climate change. In Expected Effects of Climate Change on Marine Coastal Ecosystems, (Eds. J.J. Beukema, W.J. Wolff and J.J. Brouns). Kluwer Academic Publishers, Dordrecht, The Netherlands. pp. 33–39.

McCorry, M. (2007). Saltmarsh Monitoring Project 2006 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

McCorry, M. and Ryle T. (2009). Saltmarsh Monitoring Project 2007-2008 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Nairn, R.G.W. (1986). Spartina anglica in Ireland and its potential impact on wildfowl and waders - a review. Irish Birds, 3: 215-258.

O'Reilly, H. and Pantin, G. (1957). Some observations on the salt marsh formation in Co. Dublin. Proceedings of the Royal Irish Academy, 58B, 89-128.

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

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

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

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	17700	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	17700
	operator	N/A
	unknown	No
	method	The Favourable Reference Range (FRR) is set as the current range as there is no evidence of a decline since the Directive came into force. The FRR covers all geographical and ecological variation within this habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.83		
2.4.2 Year or period	1995-2009		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	1.83
	operator	N/A
	unknown	No
	method	The Favourable Reference Area (FRA) is set at the current refined area as there have only been minor losses since the Directive came into force. The current FRA is considered adequate for the long term survival of the habitat.
2.4.13 Reason for change	Improved knowledge/more accurate data	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
Silting up (K01.02)	medium importance (M)	N/A
intensive cattle grazing (A04.01.01)	high importance (H)	Nitrogen input (N)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	Mixed pollutants (X)
reclamation of land from sea, estuary or marsh (J02.01.02)	medium importance (M)	N/A
Dykes, embankments, artificial beaches, general (J02.12)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
intensive sheep grazing (A04.01.02)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
Silting up (K01.02)	medium importance (M)	N/A
intensive cattle grazing (A04.01.01)	high importance (H)	Nitrogen input (N)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	Mixed pollutants (X)
reclamation of land from sea, estuary or marsh (J02.01.02)	medium importance (M)	N/A

Dykes, embankments, artificial beaches, general (J02.12)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
intensive sheep grazing (A04.01.02)	low importance (L)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Salicornia europaea agg.

Salicornia pusilla

Suaeda maritima

Parapholis strigosa

Plantago coronopus

Puccinellia maritima

Sagina maritima

Sagina nodosa

2.7.2 Species method used	The species in 2.7.1 were selected following a literature review, taking into account species listed in the Interpretation Manual of European Habitats, the JNCC guidelines and the Saltmarsh Monitoring Project (McCorry, 2007, McCorry & Ryle, 2009)). Replicates of 10x10m monitoring stops were examined at 64 of the 131 sites (McCorry, 2007; McCorry & Ryle, 2009). The presence of particular species from the list in 2.7.1 was one of a suite of criteria required for the stop to pass or fail for structure & functions. The list reflects the species you would expect to find in the habitat, taking into account regional variations.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Not all saltmarsh systems (e.g. fringing saltmarshes) are capable of developing extensive areas of 1310. The habitat is mainly associated with bays and estuaries where accretion is on-going.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers declining (-)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1.07	max	1.83
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Restoring coastal areas (4.4)	One-off	high importance (H)	Both	Enhance
Measures needed, but not implemented (1.2)	Recurrent One-off	medium importance (M)	Outside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		high importance (H)	Both	Not evaluated
Specific single species or species group management measures (7.4)	Recurrent One-off	high importance (H)	Both	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 1310	
0.2 Habitat code	'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 (Commission of the European Communities 2003) defines Salicornia and other annuals colonising mud and sand (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 the Republic of Ireland. There are several sub-types listed and four British National Vegetation Classification 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. The plant community "SM7 Arthrocnemum perenne stands" 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 flats 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.

Field label	Note
Habitat code: 1310	
1.1.02 Method used - map	McCorry (2007) and McCorry and Ryle (2009) mapped the area of each Annex I habitat (including Spartina swards) at 131 saltmarsh sites around Ireland as part of the Saltmarsh Monitoring Project (SMP). The habitat 1310 was recorded at 62 of these sites and had disappeared from two sites where it had previously been recorded. Ryle et al. (2009) also mapped some Annex I saltmarsh habitat at 48 coastal sites during the Coastal Monitoring Project 2004-2006 (CMP) and there was some overlap in sites visited between this survey and the SMP survey. Some, but not all, of these sites are also listed on the national saltmarsh inventory (Curtis & Sheehy-Skeffington, 1998). These data were used as the basis for the distribution map of sites known to have Salicornia mudflat 1310 habitat. To supplement these datasets the entire coastline of Ireland was examined for this report during a desktop survey to map general saltmarsh vegetation using OSI 2000 and 2005 series colour aerial photos in conjunction with OSI 6 inch maps. General saltmarsh was mapped using a GIS - Geographic Information System (ESRI Arcview 3.2) by drawing polygons over background aerial photos and/or OSI 6 inch maps. Locations of most saltmarshes (238) were known from the national saltmarsh inventory (Curtis & Sheehy-Skeffington, 1998). This included nearly all of the larger sites. Other sites were identified from the survey of aerial photos and information from Wymer (1984), Nairn (1986) and NPWS data sources. This group includes a number of sub-sites of some of the larger sites (e.g. Shannon Estuary) and many small sites at locations not included in the original national inventory. Each mapped polygon was assigned to a potential saltmarsh habitat using the available data sources and best expert opinion. Many polygons were assigned a generic saltmarsh habitat category (e.g. mosaic of Salicornia mudflat and Atlantic salt meadows) where there was no information to identify the specific Annex I habitat present These mosaic polygons were also included in the distribution map. Most saltmarsh sites have more than one Annex I saltmarsh habitat present (McCorry 2007, McCorry & Ryle 2009), but individual Annex I saltmarsh habitats can only be identified with certainty in conjunction with field based surveys. Salicornia mudflats could rarely be separated from other saltmarsh habitats using aerial photos and field surveys are required for establishing habitat boundaries. Spartina swards may be distinguished in some instances from other saltmarsh vegetation from the aerial photos, particularly where the original saltmarsh is mapped on the OSI 6 inch map. By overlaying the OSI 6 inch map over the aerial photos the change in extent of saltmarsh is visible and significant changes usually indicates the spread of Spartina swards. Wymer (1984) mapped the distribution of different saltmarsh communities around the Irish coast and these data were used to identify additional saltmarsh sites with 1310 plant communities. Some data was also available from NPWS files and databases about the distribution of various Annex I saltmarsh habitats in designated areas. McCorry (2007) and McCorry and Ryle (2009) mapped 1310 Salicornia flats in 52 10km2 grid squares during 2006-2008. An additional 7 grid squares containing quadrats listed by Wymer (1984) as containing typical communities of 1310 Salicornia flats were also included in the overall distribution. An additional 16 squares within cSACs/pNHAs assessed during the NPWS Habitats Assignment Project as containing 1310 Salicornia flats habitat and also containing records of Salicornia spp. (Preston et al. 2002) were added to the distribution. Finally, an additional 44 grid squares that contain records of Salicornia spp. from Preston et

	al. (2002) were added to the distribution map, where these areas had also been identified as 'potential saltmarsh' from the desk survey. A further 9 grid squares containing records of Salicornia spp. from Preston et al. (2002) were not included within the overall distribution for the 1310 Salicornia flats habitat, as these squares did not contain records of saltmarsh (mapped during fieldwork or desktop survey). The data above were used to plot the distribution of sites known to have 1310 Salicornia flats.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map.
1.1.04 Additional distribution map	The distribution data is in Irish grid. All data sources were intersected with the 10km Irish grid to produce this additional map. The final distribution of 1310 Salicornia flats covers 119 grid squares. A comparison with the distribution map submitted in 2007 reveals that 13 grid squares were added to the distribution and 10 grid squares were lost. These changes are due to improved knowledge, particularly from the survey work conducted by McCorry and Ryle (2009) and the modified method used (see 1.1.2). 1310 Salicornia flats are distributed around the coastline of Ireland. Swards of Salicornia spp. growing on muddy sediments are the most common sub-type. Patches of vegetation dominated by Suaeda maritima are much less common or extensive. This vegetation community may occur on muddy substrate and on stonier substrate where muddy sediments transition to shingle, pebbles and cobbles. The third sub-type (Ephemeral saltmarsh vegetation with Sagina maritima) is also much less extensive compared to swards of Salicornia spp. This plant community (Sagino maritimae-Cochlearietum danicae) is generally associated with the transition from saltmarsh to sand-dune and has been recorded in Ireland (Wymer 1984, Gaynor 2008). This transition is usually very narrow (< 1 m wide but sometimes up to 5 m wide) and this plant community is associated with unstable substrate that is affected by erosion or accretion. This vegetation type was only recorded from four sites during the Saltmarsh Monitoring Project 2006-2008.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the standardised range tool. A subset of 12 cells without any coastline was removed from the range map.
2.2 Published sources	McCorry (2007) and McCorry & Ryle (2009) are reports of two phases of the Saltmarsh Monitoring Project (SMP). Combined, these programmes surveyed the extent, structure and condition of 131 saltmarshes around Ireland, including 64 sites that supported Salicornia mudflats. Ryle et al. (2009) made preliminary assessments of saltmarshes as part of the Coastal Monitoring Project (CMP) which focussed on sand dunes. Curtis & Sheehy Skeffington (1998) drew up a inventory of saltmarshes and Wymer (1984) undertook research into the phytosociology of saltmarshes.
2.3.03 Short-term trend - Period	Although the data has been gathered from a wider time span, the default period is used.
2.3.04 Short term trend - Trend direction	Expert judgement was used to assess the trend as stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Data derived from field surveys of an additional 100 sites since the last reporting period (McCorry & Ryle, 2009) helped to refine the distribution.

Field label	Note
Habitat code: 1310	
2.3.10 c) Reason for change - use of different method	Use of the range tool resulted in a modified value for range since the last reporting period.

Field label	Note
Habitat code: 1310	
2.4.01 Surface area	McCorry (2007) and McCorry and Ryle (2009) mapped a total of 107.7 ha of 1310 Salicornia flats during the fieldwork component of the Saltmarsh Monitoring Project from 62 out of 131 sites surveyed. The area of 1310 Salicornia flats is probably somewhat under-estimated as small patches that could not be mapped were not taken into account for the measurement of area during fieldwork. This fieldwork did not map very small patches of this habitat < 1 m in size that are sometimes typically found within pans and along creeks in the established marsh. However, these small patches are not likely to form a significant combined area. The fieldwork during 2006-2008 found that the area of 1310 Salicornia flats was usually quite low compared to the rest of the saltmarsh. However, this habitat varies significantly in area with only three sites having large extents over 20 ha in size (McCorry 2007, McCorry & Ryle 2009) and the remainder having areas less than 3 ha. The average habitat area is 1.7 ha while the median area is 0.33 ha. Most of the area of 1310 was made up of patches dominated by Salicornia spp. Patches of Suaeda maritima were much less extensive. The actual area of the Sagina sub-type (Ephemeral vegetation with Sagina maritima) is also very small. The extent of this habitat was not measured during the SMP survey as it was difficult to easily establish the extent of this vegetation type. It generally occupied small patches (in the 5-50 m2 range) in a zone about only 1-5 m wide along the sand dune-saltmarsh interface. The current national area of 1310 Salicornia flats was estimated by extrapolating from data in the Satmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009). This project mapped 1310 Salicornia flats and Atlantic salt meadows (ASM) at 131 sites around the coast of Ireland and found that when the two habitats were compared, the total area of 1310 Salicornia flats was comparable to 6.8% of the total area of ASM. The total national resource of ASM has been estimated to be 2,600 ha from the GIS aerial survey of the entire coastline of the Republic of Ireland. Using the proportion of 1310 Salicornia flats comparable to the total national resource of Atlantic salt meadows (i.e. 6.8%), this gives an estimated national area for this habitat of 183 ha. However, this estimate should be treated with caution. A previous conservation status assessment report for this habitat (2007) reported that the national area of 1310 Salicornia flats was 230 ha. This figure has been revised downwards as it was based on an estimate of the total national area of ASM. This area has also been revised downwards due to more extensive fieldwork (2007-2008) and a reassessment of ASM habitat mapped in the desktop survey. The area of ASM was originally over-estimated due to several reasons, the main one being that extensive areas of other transitional habitats were originally assigned as ASM using aerial photos. The proportion of 1310 Salicornia flats when compared to ASM was also reduced to 6.8% from the original assessment, where it was 8.7%. The Favourable reference area (FRA) has also been modified due to availability of this additional data. 1310 Salicornia flats habitat can also occur on mudflats and sandflats in areas not associated with other Annex I saltmarsh habitats and these patches are probably not accounted for. The ephemeral nature of this habitat should also be considered, as it can disappear and re-appear depending on natural coastal cycles.

Field label	Note
Habitat code: 1310	
2.4.02 Year or period	The area is largely based on the examination of 2005 aerial photographs and field survey data (McCorry, 2007; McCorry & Ryle, 2009).
2.4.03 Method used - Area covered by habitat	This has been covered under Field 2.4.1
2.4.04 Short-term trend - Period	The default period is used.
2.4.05 Short-term trend - Trend direction	Best expert judgement is used to assess trend as stable.

Habitat code: 1310

Field label	Note
2.5 Main pressures	Sediment supply is particularly important to maintain this habitat as the distribution is largely determined by accretion rates. Ironically, damage to ASM (1330) and MSM (1410) through impacts such as poaching can expose fresh mud which can lead to the development of 1310 subject to the appropriate elevation and tidal inundation. McCorry (2007) and McCorry and Ryle (2009) summarised the main impacts affecting 1310 Salicornia flats surveyed at 62 sites out of 131 during 2006-2008. There were few impacts or activities that affect the most common sub-types of this habitat and this is probably due to the position of stands of Salicornia spp. and Suaeda maritima in the lower zone of the saltmarsh, which is usually quite inaccessible. Impacts and threats on the rarer sub-type of this habitat (ephemeral saltmarsh vegetation with Sagina maritima) are somewhat different and correspond to impacts and threats affecting Atlantic salt meadows at these sites. Curtis (2003) discusses the main uses of and impacts on saltmarshes in Ireland and these generally reflect the data from McCorry (2007). The main impact affecting the more common sub-types of this habitat is the spread of Spartina anglica, which is an invasive species of saltmarsh and mudflats (McCorry 2007, McCorry & Ryle 2009). Many older reports and reviews about the management of saltmarsh and invasive species state that Spartina anglica can have a negative impact on the conservation value of saltmarshes (Gray & Benham 1990). Adam (1990) noted that extensive stands of Salicornia spp. are now rare in estuaries with abundant S. anglica. Davy et al. (2001) also noted that Spartina swards have now replaced Salicornia spp. communities as the main coloniser of saltmarshes around the south-east coast of England. Spartina has a widespread distribution around the coast of Ireland, although it is not found on most saltmarshes between Clare (Loop Head) and Donegal on the west coast. It has formed areas of dense swards in many of the larger estuaries, but mainly on mudflats to the seaward side of Atlantic salt meadows. There are several reports in Ireland that indicate that Spartina swards have replaced Salicornia flats in Dublin (Fahy et al. 1975, McCorry 2007) during its spread into Irish estuaries. The most irrefutable evidence is a comparison of the distribution of saltmarsh communities in Dublin estuaries mapped in O'Reilly and Pantin (1957) to habitat maps of these sites prepared by McCorry (2007). This comparison shows that large areas of mudflats vegetated by Salicornia spp. in several Dublin estuaries are now covered with Spartina swards. There was no definitive evidence of significant spread of Spartina anglica into 1310 Salicornia flats in the current assessment period, though this was mainly due to the lack of accurate and detailed baseline data on the previous distribution of Salicornia flats. However, S. anglica is present in 29 of the 62 sites containing this habitat and Salicornia flats at most of these sites contained some S. anglica or the habitat was located close to Spartina swards, leaving it vulnerable to colonisation .It is also present at the two sites where 1310 was not found, having been recorded there in the recent past. Erosion and accretion were also noted as affecting all sub-types of this habitat. Both of these are natural processes and 1310 Salicornia flats as a coastal habitat can adjust in response to climatic and local changes. However, both these processes can create bare substrate for colonisation by Salicornia spp. Erosion of established saltmarsh can provide sediment for pioneer saltmarsh communities such as 1310 Salicornia flats (JNCC 2004). There was only one site where erosion

Field label	Note
	was assessed as having a negative impact on this habitat, and saltmarsh at this site has nearly been completely destroyed by erosion. Salicornia flats were more frequently found at sites with active accretion, especially where there were accretion ramps along the seaward edge of the saltmarsh (McCorry 2007, McCorry and Ryle 2009). Accretion was generally assessed as having a positive impact on this habitat. This habitat is also quite ephemeral at some sites, as it is quite vulnerable to erosion and accretion cycles and storms. The dynamic nature of habitat was noted during fieldwork. Some very significant changes in extent and distribution of Salicornia flats in just two years were noted at some sites were it was mapped by the Coastal Monitoring Project in 2004 (Ryle et al. 2009) and again by the Saltmarsh Monitoring Project in 2006 (McCorry 2007). Several other impacts and activities were recorded as affecting the more common sub-types of this habitat. These included grazing by cattle and sheep, as well as over-grazing by cattle. These impacts were rarely assessed as having a negative impact. Salicornia flats habitat located along the seaward side of established saltmarsh is not grazed or trampled by livestock infrequently. However, heavy disturbance of the Atlantic salt meadow zones can provide a bare substrate niche that 1310 Salicornia flats can develop in as it is a pioneer habitat (Boorman 2003). This was noted at several sites during the field surveys during 2006-2008. Some of these areas were heavily trampled by cattle at several sites and this was noted as a negative impact. Other types of disturbance to typical Atlantic salt meadow habitat may also provide suitable conditions for the colonisation of Salicornia spp. Disturbance from maintenance works to sea walls provided bare shallow hollows in sal marsh at one site that were being colonised by Salicornia spp. Two sites containing Salicornia flats were being negatively affected by eutrophication from sewage discharges. Horse-riding was noted to be affecting this habitat at one site, while Salicornia flats were damaged by vehicle activity at two other sites. There were no recorded instances of infilling and reclamation affecting this habitat during the current reporting period, although these impacts and activities have affected this habitat in the past and certainly since the Habitats Directive came into force. Curtis (2003) discusses the motivations for historical infilling and reclamation of saltmarshes most prevalent in the 18th and 19th centuries and the pressure of development in more recent times. The rarer sub-type of this habitat (ephemeral saltmarsh vegetation with Sagina maritima) is affected by impacts such as grazing by livestock and natural grazing by rabbits. Overgrazing in this habitat was noted at two of the four sites where this habitat was recorded.
2.5.01 Method used - pressures	Pressures noted at each site surveyed in the field were assigned a standardised activity code. The intensity of the activity was scored high, medium or low and the area affected estimated. For the purpose of a national assessment the proportion of sites impacted by an activity was estimated. Expert judgement was also used to assess pressures that may not have been obvious in the field.

Field label	Note
Habitat code: 1310	
2.6 Main threats	As there is no evidence to suggest there will be any reduction in the impact of current pressures the same list was used for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the severity of coastal storms (Farrell, 2009; Fealy and Murphy, 2009). Both of these will have a significant impact on the natural processes needed to create and maintain saltmarsh habitats.
2.7 Complementary information	The presence of typical or characteristic species was one of the attributes assessed for structure and functions during the Saltmarsh Monitoring Project 2006-2008. 1310 is a naturally species-poor habitat in view of the severe nature of the environment where it is found. It is limited to a small number of halophytic (salt-tolerant) species. All of the species found in the various sub-types of 1310 Salicornia flats may be found in other saltmarsh communities, particularly those of the Atlantic salt meadows and in Spartina swards). The key habitat attribute of the first two sub-types is the development of a mono-specific sward of either Salicornia spp. or Suaeda maritima on mud or sand flats. The taxonomic status of several Salicornia spp. in Ireland is uncertain due to taxonomic difficulties with this genus.
2.7.04 Structure and functions - Methods used	During the Saltmarsh Monitoring Project (SMP) the Annex I habitats at 131 saltmarsh sites (62 of which support 1310) around the Irish coast were surveyed during 2006-2008 (McCorry, 2007, McCorry & Ryle, 2009). The site list was a representative sample encompassing the variation in Irish saltmarshes with several different saltmarsh types (fringe, estuary, bay, sand flats & lagoon) and different substrates (mud, sand, gravel & peat) included (Curtis & Sheehy-Skeffington 1998). Geographical variation was also covered with sites included from the northern, western, southern and eastern coasts of Ireland. Saltmarshes inside and outside designated areas (cSACs) were also selected. These attributes have been adapted from the Joint Nature Conservancy Council's Common Standards Methodology guidelines on monitoring of saltmarshes (JNCC 2004) with inputs from NPWS, Research Branch staff. • Vegetation structure: zonation • Vegetation composition: characteristic species • Indicators of negative trend (Spartina anglica) • Other negative indicators • Indicators of local distinctiveness, such as notable plant species or vegetation mosaics. These are site-specific features, which are not adequately covered by the other attributes. Targets were set for each indicator. The indicators were assessed at a suite of 10x10m monitoring stops at each site. The proportion of stops that failed determined whether structure & functions were green (0%), amber (1-25%) or red (>25%). The approximate area of each site in poor condition was estimated by determining best and worst case scenarios. For example if a site scored amber then the area in poor condition could range from 1% to 25% or if a site scored red then the area in poor condition could range from 26% to 100%. The national area in poor condition based on the results from 64 sites where the habitat was recorded during the SMP is 0.5-9.4%

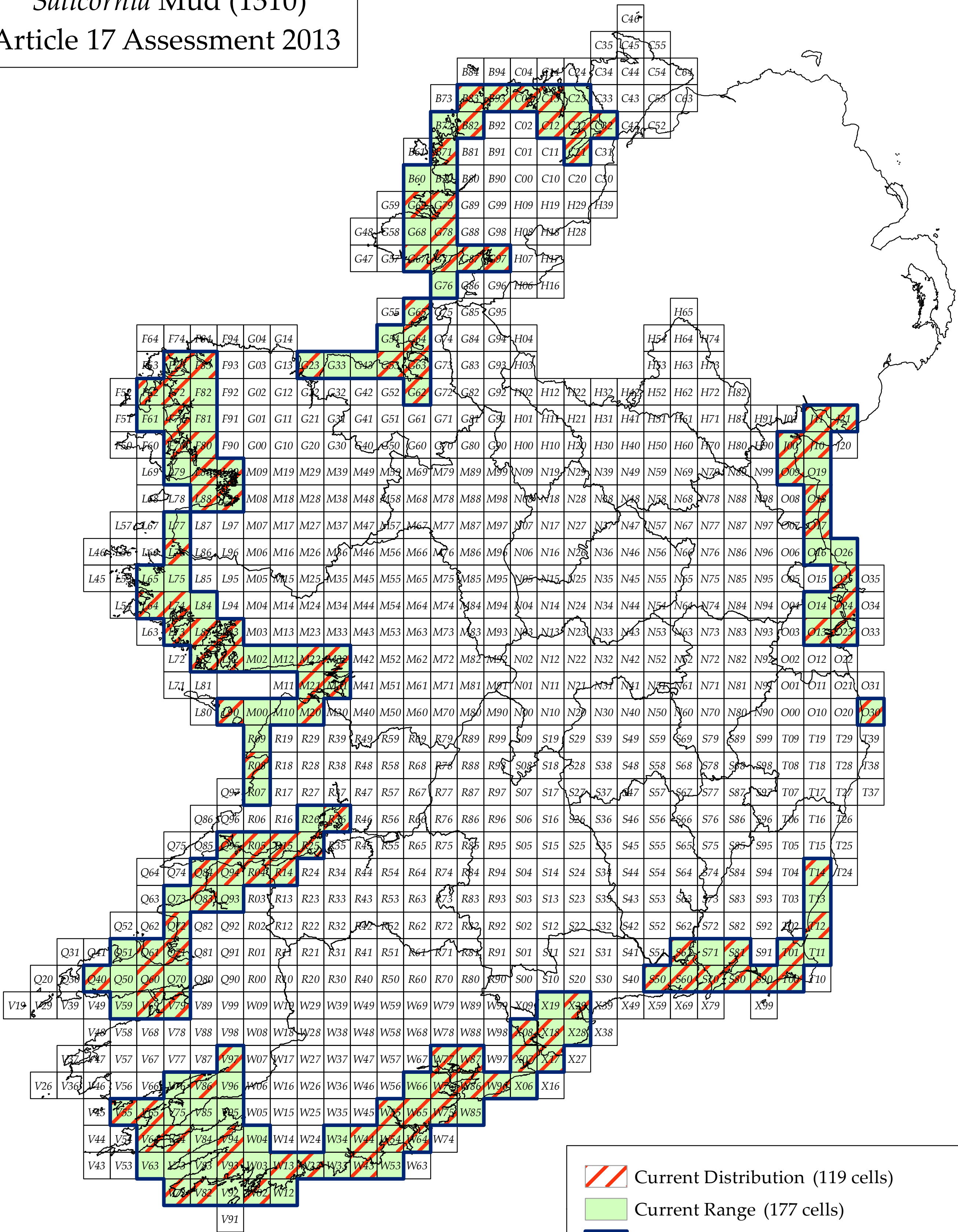
Field label	Note
Habitat code: 1310	
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Small losses of habitat during the current assessment period have not affected the current range. Tha habitat range is assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	1310 Salicornia flats were assessed at 64 of the 131 sites surveyed during 2006-2008 (McCorry 2007, McCorry & Ryle 2009). The conservation status of habitat area at 62 sites was assessed as Favourable (on a site by site basis) (Appendix I, Table 3). Two sites were assessed as Unfavourable-Bad as no 1310 Salicornia flats were mapped during the current field survey. One site (Lackan) was located within a cSAC with 1310 Salicornia flats as a qualifying interest. A second site (Grange) also lies within an SAC and had some Salicornia flats mapped during a previous survey in 2004 (Ryle et al. 2009), although this habitat had disappeared due to severe erosion and re-distribution of sediment by 2007. Spartina anglica is present in association with 1310 Salicornia flats at 29 of the 64 sites visited during 2006-2008 (McCorry 2007, McCorry & Ryle 2009). While the spread of this species is likely to have significantly affected the area of 1310 Salicornia flats, there is no quantitative data to indicate that any spread within the reporting period. There is little quantitative base-line data available for accurate comparisons of area, although at a national level it can be assumed that there are some losses of 1310 Salicornia flats during the current reporting period. The conservation status of current habitat area is however assessed as Favourable as the losses are deemed to be negligible for this naturally dynamic habitat.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure and Functions are assessed as Unfavourable-Inadequate as 0.5% -9.4% of the area surveyed (2006-2008) was considered to be in a poor condition (see 2.7.4).
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	If a similar method is applied to the 15 sites surveyed in the last reporting period 2.1-7.8% of the sites were in poor condition. The range of values are broadly similar to the current estimate. However, it should be noted that the sites in the two reporting periods were different i.e. there has not been any repeat monitoring to-date. Best expert judgement has been used to assess the trend as declining.

Field label	Note
Habitat code: 1310	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Processes such as accretion and erosion are likely to continue naturally. Accretion has a positive impact on this habitat and some sites are likely to continue to accrete sediment and provide suitable conditions for this habitat to develop. Natural disturbance is also likely to continue to provide suitable bare substrate for this habitat to develop. This can take the form of erosion and accretion cycles along rivers flowing through saltmarshes and erosion and accretion of blown sand along the transition between sand dunes and saltmarshes. Spartina anglica has the capacity to spread to new sites, particularly along the western and northern coastlines, possibly further reducing the area of 1310 Salicornia flats. Cooper et al. (2006) predict that Spartina swards will increase in area on mudflats at their lower boundaries at sites in Northern Ireland. This prediction is based on the fact that Spartina swards have not reached their potential niche limit in most of the sites in Northern Ireland. Spartina swards in the Republic of Ireland are likely to follow the same trends, particularly swards that have established more recently. Both McCorry (2007) and McCorry and Ryle (2009) noted that S. anglica was likely to be actively spreading at several sites around the country, mainly on mudflats. Some research has indicated that S. anglica may respond positively to the impacts of climate change due to changes in its competitive interactions with Puccinellia maritima and to increased temperatures (Long 1990, Loebl et al. 2006). The probable increase in the area of S. anglica is likely to have some impact on the area of 1310 Salicornia flats. Climate change predictions of increases in sea-level in the future are predicted to increase erosion of saltmarsh in Ireland (Devoy 2003, Fealy 2003). Saltmarsh is predicted to move landward in response to sea-level rise and may be subject to 'coastal squeeze' where this migration is impeded by artificial defensive structures such as sea walls. This is predicted to increase the area of lower saltmarsh communities such as 1310 Salicornia flats and reduce the area of upper saltmarsh communities (JNCC 2004). Future climate change may actually increase the area of Salicornia flats but at the expense of Atlantic salt meadows, another Annex I saltmarsh habitat. As the pressures are likely to continue into the near future at the same intensity, the future prospects are assessed as Unfavourable-Inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	In view of the on-going threat to the habitat posed by the potential spread of Spartina anglica and the uncertainty over the likely impacts of climate change, the future prospects trend is assessed as declining.
2.8.05 Overall assessment of Conservation Status	The two phases of the Saltmarsh Monitoring Project (McCorry 2007, McCorry & Ryle 2009) provided new figures for Range and Area. As there is no evidence of decline Range is assessed as Favourable. Only very small losses of the habitat from two sites resulted in a rating of Favourable for Area. Ecological data were analysed to assess structure & functions and future prospects. The invasion and spread of Spartina was identified as the main issue and resulted in an assessment of Unfavourable-Inadequate (declining) for these attributes. The overall assessment has been assessed as Unfavourable-Inadequate (declining) in view of the on-going threat posed by the invasion and spread of Spartina.
2.8.06 Overall trend in Conservation Status	In view of the on-going threat to the habitat posed by the potential spread of Spartina anglica and the uncertainty over the potential impacts of climate change, the future prospects trend is assessed as declining.

Field label	Note
Habitat code: 1310	
3.1.01 a) Surface area - Minimum	The total minimum area was estimated to be 106.82ha. This figure was obtained by taking the known and confirmed polygons from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and interstecting them with the SAC shapefile. 83.01ha of the 106.82ha that has been confirmed by fieldwork is a Qualifying Interest within an SAC, while 23.81ha is not.
3.1.01 b) Surface area - Maximum	The total maximum area was estimated to be 472.5ha. This figure was obtained by including all of the data used in the saltmarsh distribution map (including all potential sites) to get a total figure of saltmarsh within the SAC network. This figure was 5906.43ha. It is estimated that 1310 could make up approximately 8% of the total national saltmarsh resource, which would be 472.5ha. This is taken to represent the maximum surface area of Salicornia within the SAC network. This figure should be treated with some caution. The figure presented on the form equates to the Area figure in 2.4.1, due to the fact that the validation rules require the values to be < or = to the Current Area.
3.1.02 Method used	The area of the polygons (see 3.1.1) were intersected with the SAC layer.
3.1.03 Trend of surface area within the network	The areas where losses were recorded lie within the SAC network. However ,as it appears that these losses are likely to have been the result of natural processes the trend is assessed as stable.

Field label	Note
Habitat code: 1310	
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network and Salicornia mudflats that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; these regulate plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are granted only if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of this habitat is regulated under the Environment Liability Regulations 2008. Further information regarding habitat regulations can be obtained from (http://www.npws.ie/legislationandconventions/irishlaw/euergulations/). Work has progressed to restore some coastal areas after exploitation for agriculture, tourism and the removal of infill, and this has had varying levels of success to date. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. Unmanaged breaches in sea walls at several sites around the country have led to the development of new areas of intertidal habitats in land previously reclaimed as farmland (McCorry & Ryle 2009). Some 1310 Salicornia flats have developed in these new habitat areas. Processes such as accretion and erosion are likely to continue naturally. Accretion has a positive impact on this habitat and some sites are likely to continue to accrete sediment and provide suitable conditions for this habitat to develop. Natural disturbance is also likely to continue to provide suitable bare substrate for this habitat to develop. This can take the form of erosion and accretion cycles along rivers flowing through saltmarshes and erosion and accretion of blown sand along the transition between sand dunes and saltmarshes. There have been some attempts to control the spread of Spartina anglica at Bull Island, but with little success (McCorry et al. 2003). This species has been controlled intermittently using herbicides and other methods at one site in a large area mapped as 1310 Salicornia flats. The cover of S. anglica is still increasing in this area but at a slow rate. Many NPWS Conservation plans of cSACs list the monitoring and control of S. anglica as one of the primary objectives to maintain the conservation status of other species and saltmarsh habitats of conservation importance. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Some areas of saltmarsh habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. Saltmarsh is predicted to move landward in response to sea-level rise and may be subject to 'coastal squeeze' where this migration is impeded by artificial defensive structures such as sea walls. This is predicted to increase the area of lower saltmarsh communities such as 1310 Salicornia flats and reduce the area of upper saltmarsh communities (JNCC 2004). Future climate change may actually increase the area of Salicornia flats but at the expense of Atlantic salt meadows, another Annex I saltmarsh habitat.

Salicornia Mud (1310)
Article 17 Assessment 2013



Current Distribution (119 cells)

Current Range (177 cells)

Favourable Reference Range (177 cells)

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1330

NAME: Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2000-2009
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The Salt Marshes of Ireland: An Inventory and Account of their Geographical Variation. Biology and Environment: Proceedings of the Royal Irish Academy 98B, 87-104.

Curtis, T.G.F. (2003). Salt marshes. In: Wetlands in Ireland, (ed. M.J. Otte). UCD Press, Dublin.

JNCC (2004). Common Standards Monitoring Guidance for saltmarsh habitat. JNCC, Peterborough.

Farrell, G.J. (2009). Climate Change - Impacts on coastal areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The likely physical impacts of future climate change on inland waterways and the coastal environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

McCorry, M. (2007). Saltmarsh Monitoring Project 2006 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

McCorry, M. and Ryle T. (2009). Saltmarsh Monitoring Project 2007-2008 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Nairn, R.G.W. (1986). Spartina anglica in Ireland and its potential impact on wildfowl and waders - a review. Irish Birds, 3: 215-258.

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

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

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	26900		
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.3.3 Short-term trend period	2001-2012		
2.3.4 Short-term trend direction	stable (0)		
2.3.5 Short-term trend magnitude	min	max	
2.3.6 Long-term trend period			
2.3.7 Long-term trend direction	N/A		
2.3.8 Long-term trend magnitude	min	max	
2.3.9 Favourable reference range	area (km²)	26900	
	operator	N/A	
	unknown	No	
	method	The Favourable reference range (FRR) is set as the current range as there is no evidence of a decline since the Directive came into force. The FRR covers all geographical and ecological variation.	
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method		

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	25.9				
2.4.2 Year or period	2005-2009				
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.5	max		confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	25.9			
	operator	N/A			
	unknown	No			
	method	The Favourable reference area is set as the current refined area. McCorry (2007) noted a loss of 0.5% in 31 sites surveyed, this value was considered negligible in the last Article 17 submission. McCorry & Ryle (2009) noted a 0.4% loss in a sample of 100 sites. These sites were different from the previous sample, therefore the loss is not cumulative. A 0.4-0.5% loss over 12 years is considered negligible and the current value is considered adequate for the long term survival of the habitat.			
2.4.13 Reason for change	Improved knowledge/more accurate data				

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive cattle grazing (A04.01.01)	high importance (H)	N/A
intensive sheep grazing (A04.01.02)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	high importance (H)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
other industrial / commercial area (E02.03)	low importance (L)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	low importance (L)	N/A
polderisation (J02.01.01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A
Erosion (K01.01)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
intensive cattle grazing (A04.01.01)	high importance (H)	N/A
intensive sheep grazing (A04.01.02)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	high importance (H)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of industrial waste (E03.02)	low importance (L)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	low importance (L)	N/A
polderisation (J02.01.01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A
Erosion (K01.01)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

2.7.1 Species
Agrostis stolonifera
Armeria maritima
Aster tripolium
Atriplex portulacoides
Blysmus rufus
Carex distans
Carex extensa
Cochlearia officinalis
Cochlearia anglica
Festuca rubra
Glaux maritima

Juncus gerardii

Leontodon autumnalis

Limonium humile

Oenanthe lachenalii

Plantago coronopus

Plantago maritima

Puccinellia martima

Puccinellia distans

Parapholis strigosa

Salicornia europaea

Spergularia marina

Spergularia media

Suaeda maritima

Triglochin maritimum

2.7.2 Species method used	The species in 2.7.1 were selected following a literature review, taking into account species listed in the Interpretation Manual of European Habitats, the JNCC guidelines and phase one of the Saltmarsh Monitoring Project (McCorry, 2007). Replicates of 10x10m monitoring stops were examined at 100 sites (McCorry & Ryle, 2009). The presence of particular species from the list in 2.7.1 was one of a suite of criteria required for the stop to pass or fail. The list reflects the species you would expect to find in all zones within the habitat. The targets were adjusted depending on the zone. For further details see McCorry & Ryle (2009).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	The area of Atlantic Salt meadows that is listed as a Qualifying Interest within the SAC network is a minimum of 13.02km2. The period that the distribution of the habitat was derived should read 1984-2009, however this database does not allow 1984 as an entry. The current range of dates is given as 2000-2009 reflects the dates for the aerial photography and field survey from which most of the potential habitat was verified.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Favourable (FV) qualifiers N/A

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	14.79	max	25.9
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Measures needed, but not implemented (1.2)	Recurrent One-off	medium importance (M)	Both	Enhance
Restoring coastal areas (4.4)	One-off	medium importance (M)	Inside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		high importance (H)	Both	Not evaluated

Field label	Note
Habitat code: 1330	
0.2 Habitat code	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 glasswort (Salicornia spp.), annual sea-blite (Suaeda maritima) and lax-flowered sea-lavender (Limonium humile) also important. The invasive common cordgrass (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 wildfow. 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.

Field label	Note
Habitat code: 1330	
1.1.02 Method used - map	McCorry (2007) and McCorry and Ryle (2009) mapped the area of each Annex I habitat including Spartina swards at 131 saltmarsh sites around Ireland. Ryle et al. (2009) also mapped some Annex I saltmarsh habitat at 48 coastal sites during the Coastal Monitoring Project 2004-2006 and there was some overlap in sites visited between this survey and the SMP survey. Some, but not all, of these sites are also listed on the national saltmarsh inventory (Curtis & Sheehy-Skeffington, 1998). These data were used as the basis for the distribution map of sites known to have Atlantic Salt Meadows (ASM). To supplement these datasets the entire coastline of Ireland was examined for this report during a desktop survey to map other areas of saltmarsh vegetation using OSI 2000 and 2005 series colour aerial photos in conjunction with OSI 6 inch maps. These areas of saltmarsh were mapped using a GIS - Geographic Information System (ESRI Arcview 3.2) by drawing polygons over background aerial photos and/or OSI 6 inch maps. Some of these sites were confirmed by other sources including Wymer (1984), Nairn (1986) and other NPWS data sources. Each mapped polygon was assigned to a potential saltmarsh habitat using the available data sources and best expert opinion. Many polygons were assigned a generic saltmarsh habitat category (e.g. mosaic of Atlantic and Mediterranean salt meadows) where there was no information to identify the specific Annex I habitat present. Most saltmarsh sites have more than one Annex I saltmarsh habitat present (McCorry 2007, McCorry & Ryle 2009), but individual Annex I saltmarsh habitats can only be identified with certainty in conjunction with field based surveys. However, it can be assumed that all saltmarsh sites will support some ASM. Spartina swards may be distinguished in some instances from other saltmarsh vegetation from the aerial photos, particularly where the original saltmarsh is mapped on the OSI 6 inch map. By overlaying the OSI 6 inch map over the aerial photos the change in extent of saltmarsh is visible and significant changes usually indicates the spread of Spartina swards. Atlantic salt meadows could sometimes be separated from other saltmarsh habitats using aerial photos, but not in all cases, and field surveys are required for establishing habitat boundaries. Wymer (1984) mapped the distribution of different saltmarsh communities around the Irish coast and these data were used to identify additional saltmarsh sites with ASM plant communities. Some data was also available from NPWS files and databases about the distribution of various Annex I saltmarsh habitats in designated areas. Each mapped polygon was assigned to a potential saltmarsh habitat using the data sources described above and best expert opinion. Many polygons were assigned a generic saltmarsh habitat category (a mosaic of Atlantic and Mediterranean salt meadows) where there was no information to identify the specific Annex I habitat present. These data were used to plot the distribution of sites known to have ASM. The distribution of this habitat is illustrated on a 10km square grid by selecting those squares where the habitat is present.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map.
1.1.04 Additional distribution map	The distribution data is in Irish grid. All data sources were intersected with the10km Irish grid to produce this additional map.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the standardised range tool. Cells without any coastline were removed from the range map.

Field label	Note
Habitat code: 1330	
2.2 Published sources	McCorry (2007) and McCorry & Ryle (2009) are reports of two phases of the Saltmarsh Monitoring Project (SMP). Combined, these programmes surveyed the extent, structure and condition of 131 saltmarshes around Ireland. Ryle et al. (2009) made preliminary assessments of saltmarshes as part of the Coastal Monitoring Project (CMP) which focussed on sand dunes. Curtis & Sheehy Skeffington (1998) drew up a inventory of saltmarshes and Wymer (1984) undertook research into the phytosociology of saltmarshes.
2.3.03 Short-term trend - Period	Although the data has been gathered from a wider time span the default period is used.
2.3.04 Short term trend - Trend direction	Expert judgement was used to assess the trend as stable. There is no evidence of a decline in the last 12 years.
2.3.09 d) Favourable reference range - Indicate method used to set reference value (if other than operators)	Field 2.3.9d on the form details how this value was derived.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional data derived from field survey since the last reporting period (McCorry & Ryle, 2009) refined the distribution.
2.3.10 c) Reason for change - use of different method	The use of the Range tool resulted in a modified value from range since the last reporting period.
2.4.01 Surface area	The national habitat area was calculated by summing the area of polygons from the desktop survey and from fieldwork estimated to contain this habitat. This may be somewhat over-estimated during the desktop survey at the expense of other Annex I saltmarsh habitats.
2.4.02 Year or period	The area is largely based on the examination of 2005 Aerial Photographs and field derived data.
2.4.03 Method used - Area covered by habitat	This has been covered under Field 2.4.1
2.4.04 Short-term trend - Period	The default period is used.

Field label	Note
Habitat code: 1330	
2.4.05 Short-term trend - Trend direction	The area reported in 2007 was 26.7km2, which was based on a estimation and extrapolation following a survey of 31 representative site. The apparent decrease in area does not represent an actual loss of 0.8km2 but is a more accurate estimate of the national resource following more extensive fieldwork. However, an actual loss of ASM habitat of 11.0 ha was recorded by McCorry (2007) and McCorry and Ryle (2009). The reduction in area is spread over 39 sites and most losses are quite small. These were due to a range of activities of which infilling of saltmarsh and reclamation were most common. Other habitat losses were related to various other developments such as coastal protection works, a motorway, aquaculture ponds, car-parking, use of sediment from the saltmarsh to repair adjacent embankments and tracks across the saltmarsh. Although the reported losses amount to only 0.4%-0.5% over the last 12 years, these losses have occurred across a number of sites and are permanent losses of habitat. McCorry (2007) and McCorry and Ryle (2009) reported that there were very few measurable losses of habitat due to erosion within the current reporting period at any of the 131 sites visited. There are frequent signs of erosion of saltmarsh around the coast but rates of erosion are likely to be generally quite low and there has been no measurable retreat of saltmarsh (from a comparison of habitat mapping to extent of saltmarsh on different aerial photo series) during the current reporting period apart from one site (Grange). This site has been totally destroyed due to natural erosion and redistribution of sediment with an estimated loss of about 1 ha during the current reporting period. At several other sites there were measurable losses of habitat during the current reporting period, but this has largely been compensated by accretion in other parts of the sites. Erosion and accretion are site specific and in many cases the two trends compensated each other. Saltmarsh is being transformed to sand dune habitats due to natural geomorphological coastal processes at several sites. Spartina anglica has been planted and has also spread onto many of the established Irish saltmarshes along the eastern, southern and north-western coasts in the past 90 years. This species is a characteristic part of the lower zone of several sites and in some cases has transformed portions of former Atlantic salt meadow into Spartina-dominated swards (1320) and areas that were mapped as mosaics of these habitats. There were few indications of significant spread of S. anglica into Atlantic salt meadow during the current reporting period but the lack of accurate baseline data on the former distribution of this species means that a meaningful assessment can not be made. Several clumps of S. anglica were only found at one site during fieldwork (2006-2008) where it was not already known to be present (Emlagh East). Although human-related losses reported in this reporting period and the previous reporting period may be considered minor they are widespread and permanent in nature therefore the trend for area is assessed as decreasing.
2.4.12 a) Favourable reference area - In km2	Field 2.4.14d on the form details how this value was derived.

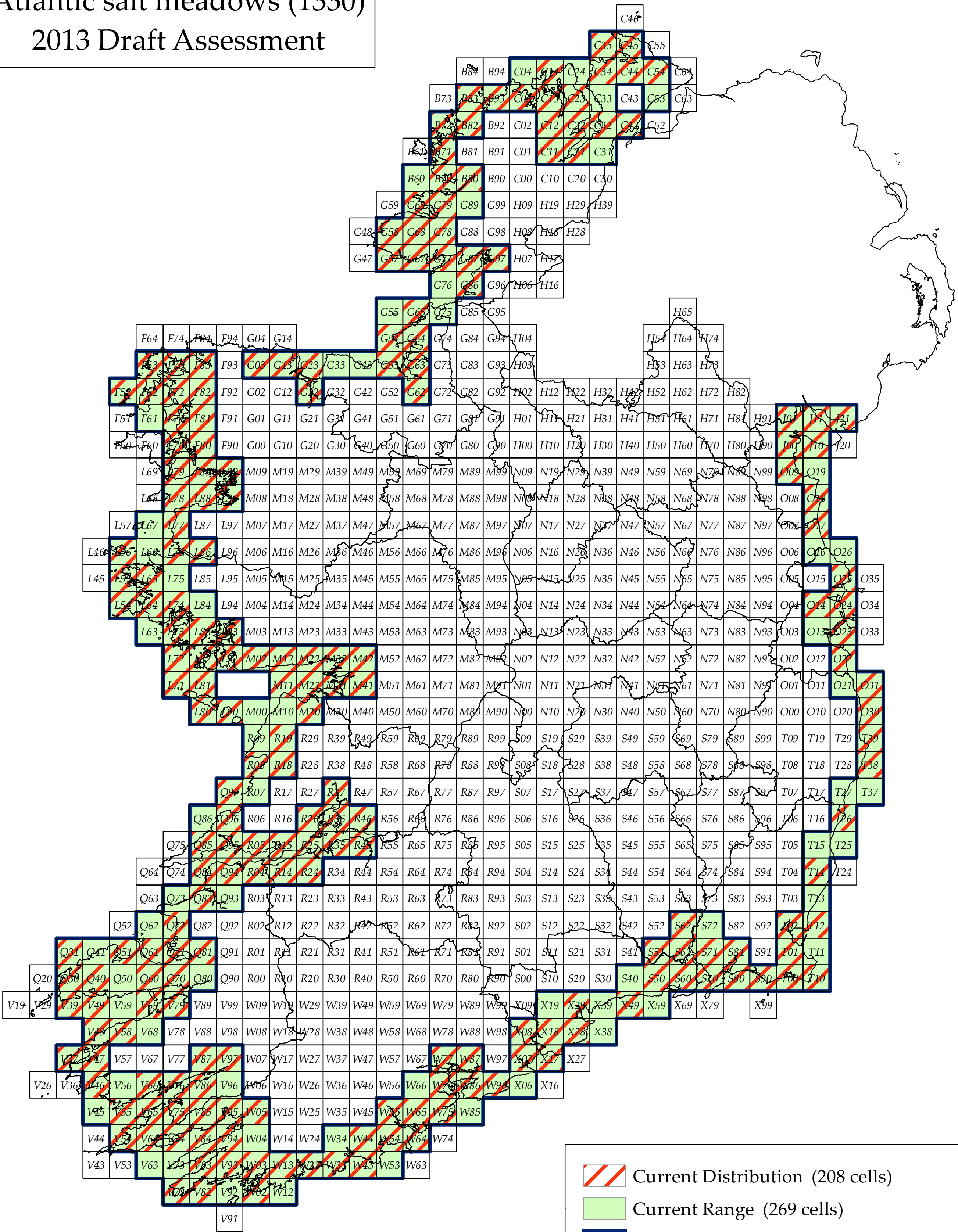
Field label	Note
Habitat code: 1330	
2.5 Main pressures	McCorry and Ryle (2009) summarised the main impacts affecting ASM surveyed at 100 sites during 2006-2008. There were few impacts or activities that have caused irreparable damage and loss of saltmarsh area and most activities were assessed as either having a reparable negative impact or no significant impact. Pressures that impacted between 4 and 14% of sites were scored Low importance; 15-24% medium importance and >25% high importance. The most common impact in the current assessment period is over-grazing by sheep or cattle. Spartina anglica is also present on many Irish saltmarshes and is considered an invasive species of the lower zones of ASM. There have been some minor losses of habitat during the current assessment period to infilling and reclamation. Many sites are also subject to erosion and accretion but these processes can largely compensate each other. Curtis (2003) discusses the motivations for historical infilling and reclamation of saltmarshes most prevalent in the 18th and 19th centuries and the pressure of development in more recent times.
2.5.01 Method used - pressures	Pressures noted at each site surveyed in the field were assigned a standardised activity code. The intensity of the activity was scored high, medium or low and the area affected estimated. For the purpose of a national assessment the proportion of sites impacted by an activity was estimated.
2.6 Main threats	As there is no evidence to suggest there will be any reduction in the impact of current pressures the same list was used for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the severity of coastal storms (Farrell, 2009; Fealy and Murphy, 2009). Both of these will have a significant impact on the natural processes needed to create and maintain saltmarsh habitats.
2.7 Complementary information	Many sources were examined to derive the list of typical species. The definition of 1330 Atlantic salt meadows as outlined in the Interpretation Manual of EU Habitats (Commission of the European Communities 2003) states that they are classified as belonging to the phytosociological order Glauco-Puccinellietalia (which belongs to the class Asteretea tripolii). The ASM plant associations belong to the Puccinellion maritimae, Armerion maritimae and Halo-Scirpion alliances. Atlantic salt meadow vegetation may vary significantly within and between sites as they contain several distinctive zones that are related to elevation and submergence frequency. The lowest communities of ASM may be flooded by most tides while the highest communities may only be infrequently flooded by high spring tides. The lowest zone of this habitat along the tidal zone is generally dominated by Puccinellia martima with species like Salicornia spp., Suaeda maritima, Spartina anglica and Limonium humile also important. The mid marsh zones are generally dominated by a characteristic community dominated by Armeria maritima and or Plantago maritima. This zone generally transitions into an upper marsh herbaceous community with Festuca rubra, Juncus gerardii and Agrostis stolonifera.

Field label	Note
Habitat code: 1330	
2.7.04 Structure and functions - Methods used	The following generalised attributes were assessed for Irish Annex I saltmarsh habitats at 100 sites selected as a representative sample of Atlantic Salt Meadows during the Saltmarsh Monitoring Project (McCorry & Ryle, 2009). The following indicators were adapted from the Joint Nature Conservancy Council's Common Standards Methodology guidelines on monitoring of saltmarshes (JNCC 2004) with inputs from NPWS, Research Branch staff. •Physical structure: creeks and pans •Vegetation structure: zonation •Vegetation structure: sward cover •Vegetation structure: sward height •Vegetation composition: characteristic species •Indicators of negative trend (Spartina anglica) •Other negative indicators •Indicators of local distinctiveness, such as notable plant species or vegetation mosaics. This last indicator represents site-specific features, which are not adequately covered by the other attributes. Targets were set for each indicator. The indicators were assessed at a suite of 10x10m monitoring stops at each site. The proportion of stops that failed determined whether structure & functions were green (0%), amber (1-25%) or red (>25%). The approximate area of each site in poor condition was estimated by determining best and worst case scenarios. For example if a site scored amber then the area in poor condition could range from 1% to 25% or if a site scored red then the area in poor condition could range from 26% to 100%. The national area in poor condition based on results from 100 sites is 4-26%.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat range is the same as the current reference range and still encompasses all the ecological variation of this habitat in Ireland. The ASM habitat is still widespread around the coast of Ireland and all sub-types are still present. The historical habitat range was likely to be been somewhat greater compared to the FRR. However, historical losses of habitat are not considered (i.e. losses due to large scale reclamation in the 18-19th century). There are virtually no prospects for restoration of former saltmarsh habitat back into urban areas, industrial areas and ports, as these areas are protected by sea walls and will be maintained. So the FRR is as large as can be achievable. Many large poldered areas used for agriculture are also currently being protected by large maintained embankments and there are very limited prospects for restoration of habitat. Atlantic salt meadows is redeveloping naturally at some sites where drainage and attempts at reclamation occurred. This, however, is unlikely to have a significant impact on the range of this habitat. Small losses of habitat during the current assessment period have not affected the current range. The habitat range of ASM is assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The conservation status of the habitat area is assessed as Favourable (FV) because the estimated losses of the area represent a negligible amount.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure and functions are assessed as Unfavourable-Inadequate as 4-26% of the area surveyed was considered to be in poor condition (see 2.7.4). Although the estimated % surpasses the 25% threshold this represents a worst case scenario and therefore the more conservative Unfavourable-Inadequate assessment is given.

Field label	Note
Habitat code: 1330	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	If a similar method is applied to the 31 sites surveyed in the last reporting period as described in 2.7.4, 8-35% of the area of the habitat surveyed was in poor condition. This would indicate an improvement in status however that the sites surveyed in the two reporting periods were different, i.e. there has been no repeat monitoring to date. Therefore it is possible that the difference between the two reporting periods may be due to the split in the sample and a more conservative stable qualifier is given.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Grazing is the most common impact affecting the future prospects of this habitat. Currently some grazing levels are still unsustainable and are affecting the structure and functions of this habitat. While some grazing level agreements are in place and are having a positive impact at several sites, there are no agreements or no proper enforcement of grazing agreements at most other sites. Saltmarsh can, however, recover from heavy grazing relatively quickly (several years). The 2006-2008 survey (McCorry 2007, McCorry & Ryle 2009) estimated that about 16% of monitoring stops carried out during 2006-2008 were affected by over-grazing, and various levels of over-grazing were recorded during the survey. The amount of infilling and reclamation of saltmarsh within designated areas should decrease due to monitoring and enforcement by NPWS staff. Infilling of non-designated sites should be regulated by local authorities as this normally requires a waste licensing permit. The future impact of Spartina anglica on ASM in Ireland is difficult to predict with any accuracy. The area of ASM replaced by Spartina swards may increase in the future as this species spreads to new sites and consolidated at sites where it is already present, but this may be compensated somewhat by development of ASM from Spartina sward due to natural succession. As grazing pressure is likely to continue into the near future at the same intensity, the future prospects are assessed as Unfavourable-Inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	There are no plans to change the grazing regime at any of these sites, however the situation is unlikely to get any worse and therefore the future prospects qualifier is assessed as stable.
2.8.05 Overall assessment of Conservation Status	Phase Two of the national saltmarsh monitoring project (McCorry & Ryle, 2009) provided new figures for Range and Area. As there is no evidence of decline in Range it was assessed as Favourable. Scall-scale with widespread and permanent losses resulted in an Unfavourable-Inadequate (stable) assessment for Area. Ecological data were analysed to assess the structure & functions and future prospects. Inappropriate grazing was highlighted as the main issue and resulted in an assessment of Unfavourable-Inadequate for these attributes. The overall assessment has been assessed as Unfavourable-Inadequate (stable) as there is unlikely to have been any recent decline in condition or any change in the immediate future.
2.8.06 Overall trend in Conservation Status	As there has been no decline in condition and there is unlikely to be any change in the status quo in the immediate future the Overall assessment trend is considered to be stable.
3.1.01 a) Surface area - Minimum	The total minimum area was estimated to be 1479.23ha. This figure was obtained by taking the known and confirmed polygons from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and intersecting them with the SAC shapefile. 1302.42ha of the 1479.23ha that has been confirmed by fieldwork as 1330 is a Qualifying Interest within an SAC, while 176.81ha is not.

Field label	Note
Habitat code: 1330	
3.1.01 b) Surface area - Maximum	The total maximum area was estimated to be 4164.5ha. This figure was obtained by including all of the data used in the saltmarsh distribution map (including all potential sites) to get a total figure of saltmarsh within the SAC network. This figure was 5906.43ha. It is estimated that 1330 could make up approximately 70% of the total national saltmarsh resource, which would be 4164.5ha. This is taken to represent the maximum surface area of ASM within the SAC network. This figure should be treated with some caution. The figure presented on the form equates to the Area figure in 2.4.1, due to the fact that the validation rules require the values to be < or = to the Current Area.
3.1.02 Method used	The area of the polygons derived for the distribution were intersected with the SAC layer.
3.1.03 Trend of surface area within the network	As there is no evidence of a decline in the national dataset the trend has been assessed as stable within SACs.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network and Atlantic salt meadows that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; these regulate plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are granted only if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of this habitat is regulated under the Environment Liability Regulations 2008. Further information regarding habitat regulations can be obtained from (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Work has progressed to restore some coastal areas after exploitation for agriculture, tourism and the removal of infill, and this has had varying levels of success to date. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Some areas of saltmarsh habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat.

Atlantic salt meadows (1330)
2013 Draft Assessment



Current Distribution (208 cells)

Current Range (269 cells)

Favourable Reference Range (269 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1410

NAME: Mediterranean salt meadows (Juncetalia maritimi)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2000-2009
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The Salt Marshes of Ireland: An Inventory and Account of their Geographical Variation. Biology and Environment: Proceedings of the Royal Irish Academy 98B, 87-104.

Curtis, T.G.F. (2003). Salt marshes. In: Wetlands in Ireland, (ed. M.J. Otte). UCD Press, Dublin.

JNCC (2004). Common Standards Monitoring Guidance for saltmarsh habitat. JNCC, Peterborough.

Farrell, G.J. (2009). Climate Change - Impacts on coastal areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The likely physical impacts of future climate change on inland waterways and the coastal environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

McCorry, M. (2007). Saltmarsh Monitoring Project 2006 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

McCorry, M. & Ryle T. (2009). Saltmarsh Monitoring Project 2007-2008 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Nairn, R.G.W. (1986). Spartina anglica in Ireland and its potential impact on wildfowl and waders - a review. Irish Birds, 3: 215-258.

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

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

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	22100	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	22100
	operator	N/A
	unknown	No
	method	The Favourable reference range (FRR) is set as the current range as there is no evidence of a decline since the Directive came into force. The FRR covers all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	10		
2.4.2 Year or period	2005-2009		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	10	
	operator	N/A	
	unknown	No	
	method	The Favourable reference area is set as the current refined area. McCorry (2007) and McCorry & Ryle (2009) noted a loss of 0.688ha in a sample of 131 sites. This is considered negligible and the current value is considered adequate for the long term survival of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive cattle grazing (A04.01.01)	high importance (H)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
Erosion (K01.01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A

infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
intensive cattle grazing (A04.01.01)	high importance (H)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
Erosion (K01.01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Agrostis stolonifera

Armeria maritima

Aster tripolium

Atriplex prostrata

Atriplex portulacoides

Carex divisia

Carex extensa

Cochlearia officinalis

Festuca rubra

Glaux maritima

Juncus acutus

Juncus gerardii

Juncus maritimus

Oenanthe lachenalii

Plantago maritima

Potentilla anserina

Puccinellia fasciculata

Spergularia media

Triglochin maritimum

Trifolium repens

2.7.2 Species method used	The species in 2.7.1 were selected following a literature review, taking into account species listed in the Interpretation Manual of European Habitats, the JNCC guidelines and phase one of the Saltmarsh Monitoring Project (McCorry, 2007). Replicates of 10x10m monitoring stops were examined at 100 sites (McCorry &

	Ryle, 2009). The presence of particular species from the list in 2.7.1 was one of a suite of criteria required for the stop to pass or fail. The list reflects the species you would expect to find in all zones within the habitat. The targets were adjusted depending on the zone. For further details see McCorry & Ryle (2009).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	The area of Mediterranean salt meadow that is listed as a Qualifying Interest within the SAC network is a minimum of 4.32km2. The period that the distribution was derived should read 1984-2009, however this database does not allow the entry of 1984. The current range of dates given as 2000-2009 covers the dates for the aerial photography and field survey from which most of the potential habitat was verified.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	5.77	max	5.91
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		high importance (H)	Both	Not evaluated

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 1410	
0.2 Habitat code	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. The habitat is distinguished from Atlantic salt meadows by the presence of rushes such as sea rush (Juncus maritimus) and/or sharp rush (J. 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 (J. gerardii), parsley water-dropwort (Oenanthe lachenalii), sea plantain (Plantago maritima) and common saltmarsh grass (Puccinellia maritima).
1.1.01 Distribution map	The map referred to in 1.1.4 was transformed to the LAEA projection.

Field label	Note
Habitat code: 1410	
1.1.02 Method used - map	McCorry (2007) and McCorry and Ryle (2009) mapped the area of each Annex I habitat (including Spartina swards) at 131 saltmarsh sites around Ireland. Ryle et al. (2009) also mapped some Annex I saltmarsh habitat at 48 coastal sites during the Coastal Monitoring Project 2004-2006 and there was some overlap in sites visited between this survey and the SMP survey. Some, but not all, of these sites are also listed on the national saltmarsh inventory (Curtis & Sheehy-Skeffington, 1998). These data were used as the basis for the distribution map of sites known to have Mediterranean Salt Meadows (MSM). To supplement these datasets the entire coastline of Ireland was examined for this report during a desktop survey to map general saltmarsh vegetation using OSI 2000 and 2005 series colour aerial photos in conjunction with OSI 6 inch maps. General saltmarsh was mapped using a GIS - Geographic Information System (ESRI Arcview 3.2) by drawing polygons over background aerial photos and/or OSI 6 inch maps. Locations of most saltmarshes (238) were known from the national saltmarsh inventory (Curtis & Sheehy-Skeffington, 1998). This included nearly all of the larger sites. Other sites were identified from the survey of aerial photos and information from Wymer (1984), Nairn (1986) and NPWS data sources. This group includes a number of sub-sites of some of the larger sites (e.g. Shannon Estuary) and many small sites at locations not included in the original national inventory. Each mapped polygon was assigned to a potential saltmarsh habitat using the available data sources and best expert opinion. Many polygons were assigned a generic saltmarsh habitat category (e.g. mosaic of Atlantic and Mediterranean salt meadows) where there was no information to identify the specific Annex I habitat present. Most saltmarsh sites have more than one Annex I saltmarsh habitat present (McCorry 2007, McCorry & Ryle 2009), but individual Annex I saltmarsh habitats can only be identified with certainty in conjunction with field based surveys. Spartina swards may be distinguished in some instances from other saltmarsh vegetation from the aerial photos, particularly where the original saltmarsh is mapped on the OSI 6 inch map. By overlaying the OSI 6 inch map over the aerial photos the change in extent of saltmarsh is visible and significant changes usually indicates the spread of Spartina swards. MSM could sometimes be separated from other saltmarsh habitats using aerial photos, but not in all cases, and field surveys are required for establishing habitat boundaries. Wymer (1984) mapped the distribution of different saltmarsh communities around the Irish coast and these data were used to identify additional saltmarsh sites with MSM plant communities. Some data was also available from NPWS files and databases about the distribution of various Annex I saltmarsh habitats in designated areas. Each mapped polygon was assigned to a potential saltmarsh habitat using the data sources described above and best expert opinion. Many polygons were assigned a generic saltmarsh habitat category (a mosaic of Atlantic and Mediterranean salt meadows) where there was no information to identify the specific Annex I habitat present. These data were used to plot the distribution of sites known to have MSM. The distribution of this habitat is illustrated on a 10km square grid by selecting those squares where the habitat is present.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map.
1.1.04 Additional distribution map	The distribution data is all in Irish grid. All data sources were intersected with the 10km Irish grid to produce this additional map.

Field label	Note
Habitat code: 1410	
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the standardised range tool. Cells without any coastline were removed from the range map.
2.2 Published sources	McCorry (2007) and McCorry & Ryle (2009) are reports of two phases of the Saltmarsh Monitoring Project (SMP). Combined, these programmes surveyed the extent, structure and condition of 131 saltmarshes around Ireland. Ryle et al. (2009) made preliminary assessments of saltmarshes as part of the Coastal Monitoring Project (CMP) which focussed on sand dunes. Curtis & Sheehy Skeffington (1998) drew up a inventory of saltmarshes and Wymer (1984) undertook research into the phytosociology of saltmarshes.
2.3.03 Short-term trend - Period	Although the data has been gathered from a wider time span the default period is used.
2.3.04 Short term trend - Trend direction	Expert judgement was used to assess the trend as stable. T here is no evidence of a decline in the last 12 years.
2.3.09 a) Favourable reference range - In km2	Field 2.3.9d on the form details how this value was derived.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional data derived from field survey since the last reporting period refined the distribution.
2.3.10 c) Reason for change - use of different method	The use of the Range tool resulted in a modified value from range since the last reporting period.
2.4.01 Surface area	The current national area of MSM as estimated by the survey of aerial photos of the entire coastline is 1000 ha (calculated by summing the area of polygons assigned to this habitat category). This figure is 27% of the total national saltmarsh area (total area of polygons), not including Spartina swards. It is difficult to estimate the area of MSM due to problems distinguishing Annex I habitats from aerial photographs alone. However, McCorry (2007) and McCorry and Ryle (2009) mapped 2171 ha of Annex I saltmarsh habitat at 131 sites and MSM also made up 27% of this area (589 ha).
2.4.02 Year or period	The area is largely based on the examination of 2005 Aerial Photographs and field derived data.
2.4.03 Method used - Area covered by habitat	This has been covered under Field 2.4.1
2.4.04 Short-term trend - Period	The default period is used.

Field label	Note
Habitat code: 1410	
2.4.05 Short-term trend - Trend direction	The area reported in 2007 was 6.5km2, which was based on a estimation and extrapolation following a survey of 31 representative sites. The apparent increase in area does not represent an actual increase of 3.5km2 but is a more accurate estimate of the national resource following more extensive fieldwork. However, the habitat area of MSM did decrease slightly during the current assessment period with a reported loss of 0.688 ha from sites surveyed by McCorry (2007) and McCorry & Ryle (2009). The most significant losses were caused by infilling and reclamation at several sites. Other losses were related to various other developments such as coastal protection, the use of sediment from the saltmarsh to repair adjacent embankments and tracks across the saltmarsh. These reported losses represent an estimated 0.07% reduction, which is considered insignificant. There are likely to be some unreported losses. McCorry (2007) and McCorry and Ryle (2009) reported that there were very few measurable losses of MSM habitat due to erosion within the current reporting period at any of the 131 sites visited. The MSM is frequently protected to some extent by its location close towards the landward side of the saltmarsh, with ASM or Spartina swards generally acting as a buffer. There are frequent signs of erosion of saltmarsh around the coast but rates of erosion are likely to be generally quite low and there has been no measurable retreat of saltmarsh (from a comparison of habitat mapping the extent of saltmarsh on different aerial photo series) during the current reporting period apart from one site (Grange). This site has been totally destroyed due to erosion and redistribution of sediment with the loss of some MSM during the current reporting period. Spartina anglica has been planted and has also spread onto many of the established Irish saltmarshes along the eastern, southern and north-western coasts in the past 90 years. This species is a characteristic part of the lower saltmarsh zone of several sites and in some cases has transformed portions of former ASM into Spartina-dominated swards (1320). Spartina was recorded at several locations on MSM, but it generally does not have a significant impact on this habitat. There are few examples of MSM dominated by J. maritimus being replaced by Spartina swards in Ireland. The second sub-type of MSM, characterised by Puccinellia fasciculata, has also been colonised by S. anglica at several sites. Although minor losses have been reported in this reporting period and the previous reporting period they are considered to be negligible and therefore the trend for area is assessed as stable.
2.4.12 a) Favourable reference area - In km2	Field 2.4.14d on the form details how this value was derived.

Field label	Note
Habitat code: 1410	
2.5 Main pressures	McCorry and Ryle (2009) summarised the main impacts affecting MSM surveyed at 83 sites during 2006-2008. There were few impacts or activities that have caused irreparable damage and loss of saltmarsh area and most activities were assessed as either having a reparable negative impact or no significant impact. Pressures that impacted between 4 and 14% of sites were scored Low importance; 15-24% Medium importance and >25% High importance. The MSM habitat has been subject to much more extensive reclamation, infilling and drainage in the past. Old drains cross this habitat and some creeks have also been channelised. Some drains may be fairly regularly cleaned or deepened. As these impacts have occurred prior to the current assessment period they are not assessed. Curtis (2003) also discusses the motivations for historical infilling and reclamation of saltmarshes most prevalent in the 18th and 19th centuries and the pressure of development in more recent times.
2.5.01 Method used - pressures	Pressures noted at each field surveyed site were assigned a standardised activity code. The intensity of the activity was scored high, medium or low and the area affected estimated. For the purpose of a national assessment the proportion of sites impacted by an activity was estimated.
2.6 Main threats	As there is no evidence to suggest there will be any reduction in the impact ofcurrent pressures the same list was used for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the severity of coastal storms (Farrell, 2009; Fealy and Murphy, 2009). Both of these will have a significant impact on the natural processes needed to create and maintain saltmarsh habitats.

Habitat code: 1410

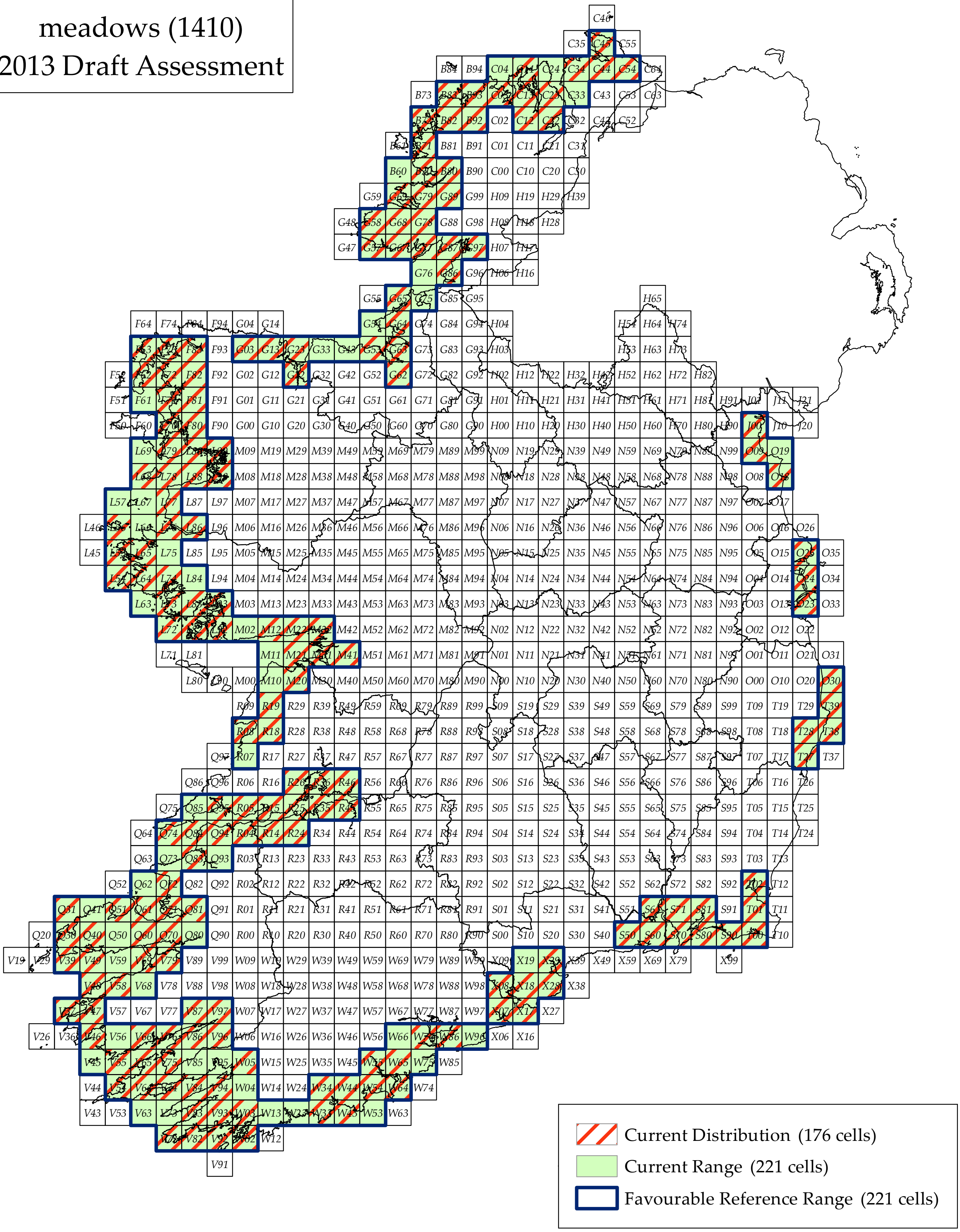
Field label	Note
2.7 Complementary information	Many sources were examined to derive the list of typical species. The Interpretation Manual of EU Habitats (Commission of the European Communities 2003) defines MSM as various Mediterranean communities of the phytosociological alliance Juncetalia maritimi, (which belongs to the class Juncetea maritimi). Several sub-types are listed. Most Irish MSM falls into the first sub-type, tall rush saltmarshes dominated by Juncus maritimus and/or J. acutus (15.51). Juncus maritimus is by far the most common tall rush found on saltmarsh in Ireland. Sites containing the rare sedge Carex divisa also fall into this sub-type. Some saltmarsh vegetation containing the rare Puccinellia fasciculata falls into the fourth sub-type, Iberian salt meadows (Puccinellion fasciculatae) (15.54). Mediterranean salt meadows vegetation belongs to the Fossitt (2000) habitat class, upper saltmarsh (CM2). The phytosociological classification of tall rush communities dominated by Juncus maritimus in Ireland is somewhat uncertain. Juncetalia maritimi is not listed in White and Doyle (1982) and they place the association Junco-maritimi-Oenanthetum lachenalii within the Armerion maritimae, which the Commission of the European Communities (2003) places within ASM (1330). Wymer (1984) identified several communities dominated by J. maritimus. Some of the vegetation was placed within the association Junco-maritimi-Oenanthetum lachenalii. Some of the vegetation communities described in Wymer (1984) were not assigned a specific phytosociological association but were placed within Armerion maritimae and some of the vegetation remained unclassified. This uncertainly probably reflects the ecological variability of vegetation dominated by Juncus maritimus. Wymer (1984) identified several plant communities with J. maritimus. Stands and clumps containing J. maritimus (occasional or frequent but not abundant) can occur in the upper marsh with most of the other species typical of upper zone Atlantic salt meadows also present, such as Agrostis stolonifera, Festuca rubra, Juncus gerardii, Plantago maritima, Glaux maritima and Cochlearia officinalis. Other vegetation may occur that has a high abundance of J. maritimus and other species present such as Oenanthe lachenalii, Trifolium repens and Leontodon autumnalis. Dense clumps of species-poor Juncus maritimus stands also occur lower down on the saltmarsh zone in the west of Ireland (Curtis 2003) and may occur adjacent to Spartina swards. Zonation within stands of J. maritimus may be observed where several communities occur together (McCorry 2007, McCorry & Ryle 2009).

Field label	Note
Habitat code: 1410	
2.7.04 Structure and functions - Methods used	The following generalised attributes were assessed for Irish Annex I saltmarsh habitats at 82 sites selected as a representative sample of Mediterranean Salt Meadows during the Saltmarsh Monitoring Project (McCorry & Ryle 2009). The following indicators were adapted from the Joint Nature Conservancy Council's Common Standards Methodology guidelines on monitoring of saltmarshes (JNCC 2004) with inputs from NPWS, Research Branch staff. •Physical structure: creeks and pans •Vegetation structure: zonation •Vegetation structure: sward cover •Vegetation structure: sward height •Vegetation composition: characteristic species •Indicators of negative trend (Spartina anglica) •Other negative indicators •Indicators of local distinctiveness, such as notable plant species or vegetation mosaics. This last indicator represents site-specific features, which are not adequately covered by the other attributes Targets were set for each indicator. The indicators were assessed at a suite of 10x10m monitoring stops at each site. The proportion of stops that failed determined whether structure & functions were green (0%), amber (1-25%) or red (>25%). The approximate area of each site in poor condition was estimated by determining best and worst case scenarios. For example if a site scored amber then the area in poor condition could range from 1% to 25% or if a site scored red then the area in poor condition could range from 26% to 100%. The national area in poor condition based on results from 83 sites is 2-15%.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	This habitat range is the same as the current reference range and still encompasses all the ecological variation of this habitat in Ireland. The MSM habitat is still widespread around the coast of Ireland and all sub-types are still present. The historical habitat range was likely to be been somewhat greater compared to the FRR but only by several grid squares. However, historical losses of habitat are not considered (i.e. losses due to large scale reclamation in the 18-19th century). There are virtually no prospects for restoration of former saltmarsh habitat back into urban areas, industrial areas and ports, as these areas are protected by sea walls and will be maintained. So the FRR is as large as can be achievable. Many large poldered areas used for agriculture are also currently being protected by large maintained embankments and there are very limited prospects for restoration of habitat. Mediterranean salt meadows is redeveloping naturally at some sites where drainage and attempts at reclamation have occurred. This, however, is unlikely to have a significant impact on the range of this habitat. Small losses of habitat during the current assessment period have not affected
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The conservation status of the habitat area is assessed as Favourable (FV) because the estimated losses of the area represent a negligible amount.

Field label	Note
Habitat code: 1410	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure and functions are assessed as Unfavourable-Inadequate as 2-15% of the area surveyed was considered to be in poor condition.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	If a similar method is applied to the 23 sites surveyed in the last reporting period as described in 2.7.4, 1-20% of the sites were in poor condition. The range of values are broadly similar to the current estimate and therefore the qualifer can be considered stable. It should be noted that the sites in the two reporting periods were different, i.e. there has been no repeat monitoring to date. Therefore it is possible that the difference between the two reporting periods may be due to the split in the sample and a more stable qualifier is given.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Grazing is the most common impact affecting the future prospects of this habitat. Currently some grazing levels outside and within SACs are still unsustainable and are affecting the structure and functions of this habitat. While some grazing level agreements are in place and are having a positive impact at several sites, there are no agreements or no proper enforcement of grazing agreements at most other sites. Saltmarsh can, however, recover from heavy grazing quite quickly (several years). Only about 6% of the monitoring stops recorded during the 2006-2008 survey (McCorry & Ryle 2009) were affected by over-grazing and various levels of over-grazing. The amount of infilling and reclamation of saltmarsh within designated areas is very small and should decrease further due to monitoring and enforcement by NPWS staff. Infilling of non-designated sites should be regulated by local authorities as this normally requires a waste licensing permit. Spartina anglica is not likely to have a significant impact on MSM in Ireland in the future, although its impact may increase by a small amount. As grazing pressure is likely to continue into the near future at the same intensity the future prospects are assessed as Unfavourable inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	There are no plans to change the grazing regime at any of these sites, however the situation is unlikely to get any worse and therefore the future prospects qualifier is assigned as stable
2.8.05 Overall assessment of Conservation Status	Phase Two of the national saltmarsh monitoring project (McCorry & Ryle, 2009) provided new figures for Range and Area. As there is no evidence of decline, Range and Area were assessed as Favourable. Ecological data were analysed to assess the structure & functions and future prospects. Inappropriate grazing was highlighted as the main issue and resulted in an assessment of Unfavourable-Inadequate for these attributes. The overall assessment has been assessed as Unfavourable-Inadequate (stable) as there is unlikely to have been any recent decline in condition or any change in the immediate future.
2.8.06 Overall trend in Conservation Status	As there has been no decline in condition and there is unlikely to any change in the status quo in the immediate future the Overall assessment trend is considered to be stable
3.1.01 a) Surface area - Minimum	The total minimum area was estimated to be 576.73ha. This figure was obtained by taking the known and confirmed polygons from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and intersecting them with the SAC shapefile. 431.66ha of the 576.73ha that has been confirmed by fieldwork as 1410 is a Qualifying Interest within an SAC, while 145.07ha is not.

Field label	Note
Habitat code: 1410	
3.1.01 b) Surface area - Maximum	The total maximum area was estimated to be 590.6ha. This figure was obtained by including all of the data used in the saltmarsh distribution map (including all potential sites) to get a total figure of saltmarsh within the SAC network. This figure was 5906.43ha. It is estimated that 1410 could make up approximately 10% of the total national saltmarsh resource, which would be 590.6ha. This is taken to represent the maximum surface area of MSM within the SAC network. This figure should be treated with some caution.
3.1.02 Method used	The area of the polygons derived for the distribution were intersected with the SAC layer.
3.1.03 Trend of surface area within the network	As there is no evidence of a decline in the national dataset the trend has been assessed as stable within SACs.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network and Mediterranean salt meadows that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; these regulate plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are granted only if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of this habitat is regulated under the Environment Liability Regulations 2008. Further information regarding habitat regulations can be obtained from (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Work has progressed to restore some coastal areas after exploitation for agriculture, tourism and the removal of infill, and this has had varying levels of success to date. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Some areas of saltmarsh habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat.

Mediterranean salt meadows (1410) 2013 Draft Assessment



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 2.0
Date - Dáta
26-08-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 1420

NAME: Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2000-2009
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Anon (1999). Flora Protection Order 1999. Government of Ireland.

Commission of the European Communities (2007). Interpretation manual of European Union Habitats-EUR 27. DG Environment-Nature and Biodiversity. Brussels.

Cross, J. (2006). The potential natural vegetation of Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 106B, 65-106.

Curtis, T.G.F. and McGough, H.N. (1988). The Irish Red Data Book. Stationary Office, Dublin.

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The Salt Marshes of Ireland: An Inventory and Account of their Geographical Variation. Biology and Environment: Proceedings of the Royal Irish Academy 98B, 87-104.

Davy, A.J, Bishop, G.F, Mossman, H., Redondo-Gómez, S, Castillo, J.M. Castellanos, E.M., Luque, T. and Figueroa, E.M. (2006). Biological Flora of the British Isles: Sarcocornia perennis (Miller) A.J. Scott. Journal of Ecology 94, 1035–1048.

Devoy, J. (2003). Coastal vulnerability and the implications of sea-level rise for Ireland. Journal of Coastal Research. Submitted for publication. http://geography.nuim.ie/ICARUS/present/Coastal Vulnerability.pdf.

Fealy, R. (2003). The impacts of climate change on sea level and the Irish coast. In, Climate change: Scenarios and impacts for Ireland. (Eds. J. Sweeney et al.). (2000-LS-5.2.1-M1). Environmental Protection Agency, Johnstown.

Ferguson, I. K. (1962). Salicornia perennis Mill. In Ireland. Irish Naturalists Journal, 14, 18-19.

Ferguson, I. K. (1964). A new station for Salicornia perennis Mill in Ireland. Irish Naturalists Journal, 14 215.

JNCC. (2004). Common Standards Monitoring guidance for saltmarsh habitat. JNCC, Peterborough.

McCorry, M. (2007). Saltmarsh Monitoring Project 2006 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

McCorry, M. and Ryle T. (2009). Saltmarsh Monitoring Project 2007-2008 – Summary Report. An unpublished report for the National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

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

Rodwell, J.S. (ed.) (2000). British Plant Communities, Volume 5: Maritime communities and vegetation of open habitats. Cambridge University Press, Cambridge.

Wallace, E. (1995). Aspects of the Ecology of Arthrocnemum perenne in Ireland. Unpublished study, University College Cork.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	400	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	400
	operator	N/A
	unknown	No
	method	The Favourable Reference Range (FRR) is set as the current range as there is no evidence of a decline since the Directive came into force.
2.3.10 Reason for change		

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.011		
2.4.2 Year or period	2006-2008		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	Unquantified losses have been recorded and the habitat has	

disappeared from two previously known sites. Favourable Reference Area (FRA) is set at a value of at least 25% greater than the current extent.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	low importance (L)	N/A
Erosion (K01.01)	high importance (H)	N/A
Silting up (K01.02)	high importance (H)	N/A
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
intensive sheep grazing (A04.01.02)	low importance (L)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
Changes in biotic conditions (M02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	high importance (H)	N/A
off-road motorized driving (G01.03.02)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	low importance (L)	N/A
Erosion (K01.01)	high importance (H)	N/A
Silting up (K01.02)	high importance (H)	N/A
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A
intensive sheep grazing (A04.01.02)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
Changes in biotic conditions (M02)	high importance (H)	N/A
species composition change (succession) (K02.01)	high importance (H)	N/A
off-road motorized driving (G01.03.02)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.7.1 Species

Sarcocornia perennis
Salicornia spp.
Puccinellia maritima
Limonium humile
Plantago maritima
Suaeda maritima
Aster tripolium
Spergularia marina
Atriplex portulacoides

2.7.2 Species method used	The species in 2.7.1 were selected following a literature review, taking into account species listed in the Interpretation Manual of European Habitats, the JNCC guidelines and phase one of the Saltmarsh Monitoring Project (McCorry, 2007). However, for the Saltmarsh Monitoring Project the species Sarcocornia perennis defined the habitat and had to be present to confirm the presence of this habitat. Replicates of 10x10 m monitoring stops were examined at 82 sites (McCorry & Ryle, 2009). The presence of the species listed in 2.7.1 was one of a suite of criteria required for the stop to pass or fail.
2.7.3 Justification of % - thresholds for trends	In the absence of good information on the historical extent of the habitat at each site, it is not possible to accurately assess the true % loss. However, the loss of two sites is considered significant enough to justify an Unfavourable-Bad rating for Area.
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	The fact that this habitat is categorized by a single species that is generally not frequent in cover leads to difficulties in establishing and mapping the extent, characteristics and structure of Halophilous scrubs. It is generally found in saltmarsh vegetation that would otherwise be classified as Atlantic salt meadows (ASM) or Spartina swards if Sarcocornia perennis was not present. The habitat was generally mapped by drawing boundaries around clusters of Sarcocornia perennis noted by GPS. There was potential to significantly change the mapped area of Halophilous scrubs by either dividing clusters of plants into separate patches of habitat or including them in one patch of habitat and increasing the area significantly. This issue is exacerbated by the fact that the national total for this habitat is so small, so even relatively small changes in the way the way the habitat is mapped can have significant impacts on the final total.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	declining (-)

2.8.3 Specific structures and functions (incl Species)	assessment Favourable (FV) qualifiers N/A
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.011	max	0.011
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent One-off	medium importance (M)	Inside	Enhance
Restoring coastal areas (4.4)	One-off	high importance (H)	Inside	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
No measure known/ impossible to carry out specific measures (1.3)		high importance (H)		Not evaluated
Specific single species or species group management measures (7.4)	Recurrent One-off	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 1420	
0.2 Habitat code	Halophilous scrubs are 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 "SM 21 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 characterized 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 metre 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. 1999). It is also listed in the Red Data Book (Curtis & McGough 1988) as 'Vulnerable'. 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. 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).

Field label	Note
Habitat code: 1420	
1.1.02 Method used - map	The following data sources were used to map the occurrence of Halophilous scrubs in Ireland on 10km square basis: • Information on designated sites, candidate Special Areas of Conservation (cSACs), National Heritage Areas (NHAs), candidate National Heritage Areas (cNHAs) and potential National Heritage Areas (pNHAs) • Information about rare species (Sarcocornia perennis) held on file by the National Parks and Wildlife Service (NPWS Rare Plant Database) • Saltmarsh Monitoring Project 2006 (McCorry 2007) • Saltmarsh Monitoring Project 2007-2008 (McCorry & Ryle 2009) • Coastwatch survey of Bannow Bay 2006 (unpublished data) • Other data sources (Preston et.al. 2002) • Digital ortho-rectified aerial photographs (Ordnance Survey Ireland (OSI) 1995, 2000 and 2005 series) • OSI 6 inch maps • National saltmarsh inventory (Curtis & Sheehy-Skeffington 1998) Information held in NPWS databases and files was used to identify saltmarshes where Sarcocornia perennis (and consequently Halophilous scrubs) was present. McCorry (2007) and McCorry and Ryle (2009) mapped the extent of Halophilous scrubs at all of the known sites containing S. perennis. Halophilous scrubs formed a mosaic with Atlantic Salt Meadows (ASM) and Spartina swards. The extent of Halophilous scrubs was mapped by drawing boundaries around clusters of individual S. perennis plants noted by GPS. The national area was calculated by summing the area from each of these sites. These data were used to plot the distribution of sites known to have Halophilous scrubs. The distribution of this habitat is illustrated on a 10km square grid by selecting those squares where the habitat is present. The distribution of sites where this habitat is present reflects the current distribution of records from Preston et al. (2002) for Sarcocornia perennis.
1.1.03 Year or period	Base on the list of sources used to generate the distribution map.
1.1.04 Additional distribution map	The distribution data is in Irish grid. All data sources were intersected with the10km Irish grid to produce this additional map. A comparison with the distribution map submitted in 2007 revealed that at a 10km2 level the distribution remains unchanged. However, significant changes have occurred at a 1km2 level (see 2.4.1). These changes are due to improved knowledge, particularly from the survey work conducted by McCorry and Ryle (2009).
1.1.05 Range map	The current range map of halophilous scrub is the same as the current distribution map.
2.2 Published sources	McCorry (2007) and McCorry & Ryle (2009) are two reports from the Saltmarsh Monitoring Project (SMP). Combined, these programmes surveyed the extent, structure and condition of 131 saltmarshes around Ireland, including 5 sites that supported Halophilous scrub. Ryle et al. (2009) made preliminary assessments of saltmarshes as part of the Coastal Monitoring Project (CMP) which focussed on sand dunes. Curtis & Sheehy Skeffington (1998) drew up a inventory of saltmarshes and Wymer (1984) undertook research into the phytosociology of saltmarshes.
2.3.03 Short-term trend - Period	Default period is used.
2.3.04 Short term trend - Trend direction	Trend is stable as there has been no decline in the range in this reporting period.

Field label	Note
Habitat code: 1420	
2.4.01 Surface area	McCorry (2007) and McCorry and Ryle (2009) have now surveyed all known sites for this habitat. The total current habitat extent is 1.086 ha spread across 5 different sites. Previous estimates of this habitat area were based on less accurate data. Previous surveys of Sarcocornia perennis at Ballyteige show that this species formerly had a wider distribution than indicated by the SMP survey (McCorry 2007). Increased survey work may increase records of S. perennis at Ballyteige. The frequency and distribution of S. perennis at Fethard may also be somewhat under-surveyed. Therefore, the above total habitat extent may be slightly lower than the actual total habitat extent. At Ballyteige it was found generally in the mid-lower saltmarsh zone on mud with Puccinellia maritima and Limonium humile predominant. Wallace (1995) concluded that Sarcocornia perennis was restricted to pans and areas subject to water-logging in a narrow band of saltmarsh (at Grange and Ballyteige). Sarcocornia perennis was also found around the edges of pans and channels of saltmarsh at Taulaght, Fethard and Bannow Island, where it is associated with Armenia maritima, Plantago maritima, Limonium humile, Spartina anglica, Puccinellia maritima and Salicornia spp. Several large clumps of Sarcocornia perennis were also found on well-drained shingle banks at Gorteens and Taulaght. These plants were quite woody and seemed older compared to the plants on the saltmarsh. The S. perennis was found in association with clumps of Atriplex portulacoides, Beta maritima and Glaux maritima. Sarcocornia perennis was also associated with the transition zone between Spartina swards and ASM at Gorteens, Bannow Island and Fethard. It is associated with dense Spartina anglica, Puccinellia maritima and Salicornia spp. that has vegetated soft mud. Several Sarcocornia perennis plants were also noted as growing amongst clumps of Juncus maritimus that were distributed along an old saltmarsh cliff at Gorteens.
2.4.02 Year or period	Area is entirely based on data from the Saltmarsh Monitoring Project (McCorry 2007, McCorry & Ryle 2009).
2.4.04 Short-term trend - Period	Default period is used.
2.4.05 Short-term trend - Trend direction	Due to the disappearance of Sarcocornia perennis from two sites, trend is assessed as declining.

Field label	Note
Habitat code: 1420	
2.5 Main pressures	McCorry (2007) and McCorry and Ryle (2009) summarised the main impacts affecting Halophilous scrubs at the site visited. There are few impacts and activities currently affecting this habitat. One site is grazed by cattle, but this has very little impact at present on the Halophilous scrubs. There is some infilling of spoil along a track at a second site that has the potential to damage this habitat. Accretion has promoted the expansion of saltmarsh that has been colonised by Sarcocornia perennis at two sites. Eutrophication is affecting one site (Fethard), but no direct impacts on S. perennis were noted. Earlier works on this habitat have noted the colonisation of the Spartina anglica as a potentially negative impact. This species is an invasive species of saltmarsh and mudflats in Ireland (954). However,the recent survey work by McCorry & Ryle (2009) found that Sarcocornia perennis co-existed happily with Spartina swards at three out of five sites. Its most characteristic habitat was the Atlantic salt meadow/Spartina sward transition zone and it was found more frequently in this zone than in adjacent saltmarsh where Spartina anglica was absent. Two of these sites contain saltmarsh that has only recently established in the past 60 years after colonisation by S. anglica, so S. perennis has actually colonised these Spartina-rich areas. The impact of this invasive species is likely to be much less significant than previously thought; futher monitoring should establish the intensity of the impact, therefore the pressure is still retained and considered to have a Low impact. This habitat has been affected by tracks created by off-road vehicles in the past. One site (Ballyteige) was also affected by horse riding activities in the past (early 1990’s) but has been in recovery since then. Part of the saltmarsh was harrowed to create a track but this practise has since been stopped. Heavy overgrazing by sheep is thought to have lead to the extinction of Sarcocornia perennis at a second site (Duncormick). Erosion and the related re-distribution of sand severely impacts one site containing this habitat (Grange). This erosion may have been promoted by extraction of beach material in the past.
2.5.01 Method used - pressures	Pressures noted at each site surveyed in the field were assigned a standardised activity code. The intensity of the activity was scored high, mediumo r low and the area affected estimated. For the purpose of a national assessment the proportion of sites impacted by an activity wws estimated. Expert judgement was also used to assess pressures that may not have been obvious in the field.
2.6 Main threats	As there is no evidence to suggest there will be any reduction in the impact of current pressures the same list was used for threats. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the severity of coastal storms (Farrell 2009, Fealy and Murphy 2009). Both of these will have a significant impact on the natural processes needed to create and maintain saltmarsh habitats. Consequently M01 changes in abiotic conditions are rated as a High threat. Any decline in the species Sarcocornia perennis could lead to the disappearance of this habitat, which is why M02 is also rated as a High future threat.

Habitat code: 1420

Field label	Note
2.7 Complementary information	Halophilous scrubs in Ireland is characterised by the presence of Sarcocornia perennis, although it may not be plentiful within the saltmarsh vegetation. It is generally found in vegetation that would otherwise be classified as ASM or Spartina swards, if S. perennis was not present.The scarcity of this species in Ireland and the lack of a distinctive vegetation community or suite of typical species in Ireland limit the assessment of typical species for Halophilous scrubs. Halophilous scrubs are defined by the EU Habitats Interpretation Manual (Commission of the European Communities 2003) as perennial vegetation of saline muds that belong to the phytosociological class (Sarcocornetea fruticosi). Other saltmarsh species that are associated with this habitat and are found in Ireland include Atriplex portulacoides, Aster tripolium and Salicornia spp. Irish Halophilous scrub vegetation corresponds somewhat with the British National Vegetation Classification plant community, 'Arthrocnemum perenne stands' (SM7) (Rodwell 2000). This community is described as an open mosaic of Sarcocornia perennis with Atriplex portulacoides, Puccinellia maritima and Suaeda maritima at the lower limit of ASM. The cover of Sarcocornia perennis can vary between several individuals to up to 90% cover in this community. Davy et al. (2006) found that S. perennis was most commonly associated with Puccinellia maritima, Suaeda maritima, Atriplex portulacoides, Salicornia europaea agg., Limonium vulgare, Aster tripolium and Spartina anglica and had a mean cover of 26%. The presence of typical or characteristic species was one of the attributes assessed for Structure & Functions during the Saltmarsh Monitoring Project (McCorry 2007, McCorry & Ryle 2009). This project recorded Sarcocornia perennis amongst lower saltmarsh zone vegetation and is mostly associated with Puccinellia maritima, Limonium humile, Spartina anglica, Salicornia sp. Suaeda maritima, Armeria maritima, Plantago maritima, with smaller amounts of Atriplex portulacoides, Aster tripolium and Spergularia media. S. perennis was rarely frequent or abundant in cover in quadrats surveyed by McCorry (2007), and McCorry and Ryle (2009) and is mainly found at low cover values < 5%. Based on the current available information, the conservation status of typical species of Halophilous scrubs is assessed as Favourable.

Field label	Note
Habitat code: 1420	
2.7.04 Structure and functions - Methods used	The following generalised attributes were assessed for Irish Annex I saltmarsh habitats at 131 sites selected as a representative sample of Irish saltmarshes during the Saltmarsh Monitoring Project (SMP) (McCorry 2007, McCorry & Ryle 2009). The site list was a representative sample encompassed the variation in Irish saltmarshes with several different saltmarsh types (fringe, estuary, bay, sand flats & lagoon) and different substrates (mud, sand, gravel peat) included (Curtis & Sheehy-Skeffington 1998). Geographical variation was also covered with sites included from the northern, western, southern and eastern coasts of Ireland. Saltmarshes inside and outside designated areas (cSACs) were also selected. These attributes have been adapted from the Joint Nature Conservancy Council's Common Standards Methodology guidelines on monitoring of saltmarshes (JNCC 2004) with inputs from NPWS, Research Branch staff. • Physical structure: creeks and pans • Vegetation structure: zonation • Vegetation structure: sward cover • Vegetation composition: characteristic species • Indicators of negative trend (< 5% cover of Spartina anglica) • Other negative indicators • Indicators of local distinctiveness, such as notable plant species or vegetation mosaics. These are site-specific features, which are not adequately covered by the other attributes. However, 1420 was only recorded from a total of 5 sites during the SMP. McCorry (2007) and McCorry and Ryle (2009) recorded Sarcocornia perennis in several different situations and associated with several different habitats. It does not appear to be restricted to one typical vegetation type. It is mainly associated with the lower-mid saltmarsh zone. Patches of habitat are characterised by small clusters of S. perennis that may only be several metres in length or diameter so it is difficult to separate structure and functions of this particular area from the surrounding saltmarsh.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Halophilous scrubs are distributed in a small area along the south-east coastline of Ireland in Co. Wexford. Five different saltmarsh sites are thought to contain this habitat and are found in two cSACs, Bannow Bay and the adjacent Ballyteige Burrow. The range of Halophilous scrubs may have contracted slightly in the past due to infilling and reclamation of saltmarsh for agricultural purposes, particularly at Ballyteige Burrow. Most of this reclamation occurred in the 19-20th century. However, it is not known if this former saltmarsh contained Sarcocornia perennis and Halophilous scrubs. There are no indications from the current records of S. perennis that the habitat range is expanding or contracting significantly. The probable extinction of S. perennis at two out of seven sites where it has been previously recorded has not affected its range due to the distribution of these sites. The range as defined by 10 km grid squares remains the same. The habitat range of Halophilous scrubs is assessed as Favourable.

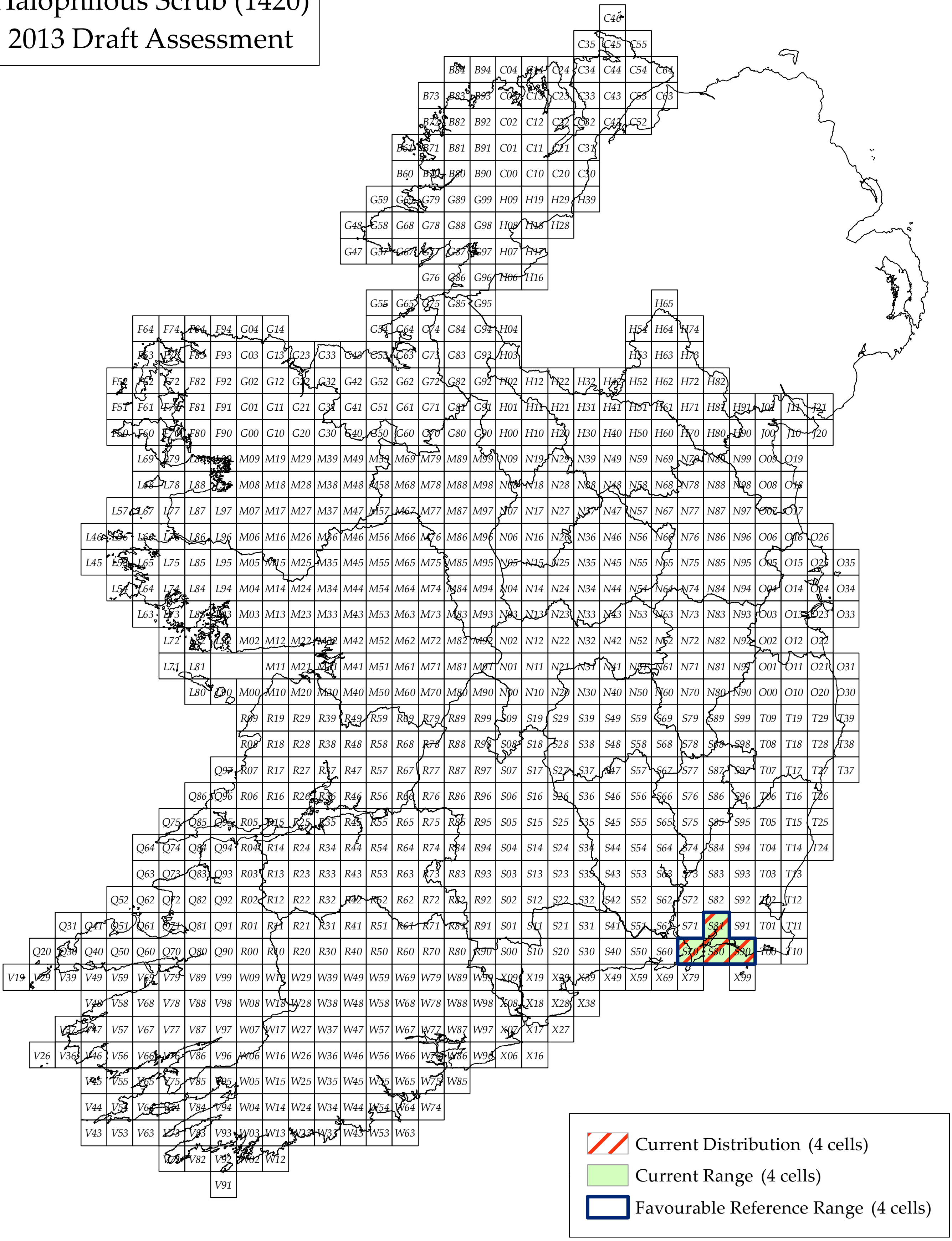
Field label	Note
Habitat code: 1420	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Even small losses of habitat can be significant as the favourable reference area is so small. McCorry (2007) and McCorry and Ryle (2009) have surveyed all known sites for this species. Sarcocornia perennis is now thought to be extinct at two sites (Duncormick & Grange). It was last recorded at Duncormick in 1990. This site was subject to heavy sheep grazing around this time. Sarcocornia perennis was last recorded in 1995 at Grange and is probably extinct due to severe erosion and habitat change (natural inland movement of sand) at this site during the current monitoring period. Sarcocornia perennis was reconfirmed at four other sites and was found to be more frequent and have a more widespread distribution at three of these sites (Bannow Island, Taulaght and Fethard) compared to former surveys. It was also found at a recently discovered site (Gorteens, 2006). The increased number of records at Fethard may reflect an increase in the population of this species (and Halophilous scrub) during the current monitoring period at this site. However, it is difficult to assess if the frequency and distribution of S. perennis has changed significantly at the other sites during the current monitoring period or if the increased number of records reflects more intensive survey work. Previous surveys of Sarcocornia perennis (NPWS Rare Plant Database 1990, Wallace 1995) show that this species formerly had a wider distribution at Ballyteige than indicated by McCorry (2007). The reduction in area of Halophilous scrub at this site may be partly due to damage caused by negative impacts and activities (horse-riding) around the start of the current monitoring period, and may also be due to under-recording of this species. The conservation status of the habitat area is assessed as Unfavourable-Bad, mainly due to the extinction of Sarcocornia perennis at two sites and the possible reduction of area at a third site.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Halophilous scrub formerly had a wider distribution at Ballytiege and this habitat has now disappeared from Grange during the current monitoring period (see Appendix I). Therefore the trend is assessed as declining.

Field label	Note
Habitat code: 1420	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The structure and functions of Halophilous scrub was assessed as favourable at five sites where the habitat is still present. No damage was noted to any creeks, pans or depressions in the habitat. The sward cover within the habitat varies from site to site and there is no heavy grazing affecting this habitat. Only one site is being grazed at present (Ballyteige). Sarcocornia perennis can be found within a dense sward of Spartina anglica about 0.4 m high. The SMP survey recorded Sarcocornia perennis in a distinctive zone at several sites and zonation of the saltmarsh at these sites is still intact. There have been no significant changes to the characteristic species of this zone. However, it is also found in several different situations such as shingle banks and this is taken as a positive indicator. Sarcocornia perennis is found associated with dense Common Cordgrass at several sites and seems to happily co-exist with this species. Previous works suggested that this species may be threatened by colonisation of this invasive species of saltmarsh and mudflats. Colonisation by this species is still considered to be an indicator of negative trend for ASM (1330) and Salicornia flats (1310). However, this now does not seem to be the case for S. perennis. It is found in recently developed areas of Spartina sward/ASM mosaic at Gorteens and Bannow Island, which have only developed since the establishment of these swards within the past 60 years. This suggests that it has reproduced and colonised newly developing saltmarsh during this period. This is a positive indicator for structure and functions. The population structure of S. perennis at Fethard also seems to have changed and there are more frequent smaller clumps of younger plants. This is also taken as a positive indicator for structure and functions. The structure and functions of Halophilous scrub was not assessed at the two sites where Sarcocornia perennis is now thought to be extinct (Duncormick and Grange). Excessive grazing is thought to have damaged one site and possibly lead to the extinction of this species (Duncormick). Severe natural erosion and re-distribution of sediment has also destroyed a second saltmarsh where this species was present (Grange). The overall conservation status of the habitat structure and functions is assessed as Favourable.

Field label	Note
Habitat code: 1420	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	All of the sites thought to contain Halophilous scrubs are found within 2 separate cSACs for which 1420 is a Qualifying Interest and therefore are protected from pressures such as infilling, reclamation and unsustainable grazing levels. Two of these sites are also located within a Nature Reserve, so NPWS has direct responsibility for its management. Notifiable actions have been set for saltmarsh habitats within cSACs. Actions such as alteration of watercourses, reclamation, and the use of the saltmarsh for commercial activities require consent from the Department of Arts, Heritage and the Gaeltacht. There are no significantly damaging activities currently acting on Halophilous scrubs at the remaining sites. Only one site is currently being grazed. Any future colonisation by Spartina anglica is not now thought to be negative impact on this habitat. Erosion in Bannow Bay is balanced somewhat by accretion in other parts of these sites (Gorteens) and in other sites (Bannow Island). Saltmarsh (mainly Spartina swards) has expanded at both these sites in the past 60 years to provide new habitat for Sarcocornia perennis. This species has the capacity to re-colonise one of the sites where it has previously gone extinct, which is now in good condition (Duncormick). At Ballyteige Burrow cSAC and Nature Reserve, it was noted that Halophilous scrubs had been affected by horse-riding activities at this site in the recent past, but had recovered somewhat since the cessation of this activity. The prospects for sensitive management to promote the conservation status of this habitat on this site are favourable. However, it should be noted that as the national area of this habitat is so small, any small losses of area or changes in intensity of impacts will be very significant. There is little data in Ireland to assess with accuracy the potential impacts of climate change on Halophilous scrubs. Overall, the future prospects of Halophilous scrubs are assessed as Unfavourable-Inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	In light of on-going losses and the further potential negative impacts on this habitat from climate change the trend is assessed as declining. The habitat is reliant on the maintainence of a single species, which is already severely restricted in its distribution. Wallace (1995) stated that Sarcocornia perennis may be restricted in its distribution in Ireland due to climatic factors. This makes the habitat highly vulnerable to climate change.
2.8.05 Overall assessment of Conservation Status	Overall the conservation status of 1420 halophilous scrub is assessed as Bad (declining), particularly because of the losses that have been recorded and the vulnerability of the habitat, which is dependent on a rare species with a restricted distribution.
3.1.01 a) Surface area - Minimum	All known areas of this habitat are located within the NATURA 2000 network. The total area that has been mapped is 1.086ha, which is set as the minimum.
3.1.03 Trend of surface area within the network	All losses have been from sites within the NATURA 2000 network, so trend is assessed as declining.

Field label	Note
Habitat code: 1420	
3.2 Conservation measures	Some measures are in place and have a beneficial effect. All of the habitat is included within the Natura 2000 network and as Halophilous scrub is listed as a qualifying feature in the relevant SACs it is protected by the 2011 Habitat Regulations; these regulate plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are granted only if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of this habitat is regulated under the Environment Liability Regulations 2008. Further information regarding habitat regulations can be obtained from (http://www.npws.ie/legislationandconventions/irishlaw/euergulations/). Work has progressed to restore some coastal areas after exploitation for agriculture, tourism and the removal of infill, and this has had varying levels of success to date. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Some areas of saltmarsh habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. Saltmarsh is predicted to move landward in response to sea-level rise and may be subject to ‘coastal squeeze’ where this migration is impeded by artificial defensive structures such as sea walls.

Halophilous Scrub (1420)
2013 Draft Assessment



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2110

NAME: Embryonic shifting dunes

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Anon (2010). Meath Wetlands and Coastal Habitats Survey. Report prepared for Meath County Council and The Heritage Council.

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on ‘Ireland at Risk’, for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

County Council Geographic Information from Fingal and Dun Laoghaire-Rathdown County Councils.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	14700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	14700
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Habitats Directive came into force.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.99				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.47	max	1.29	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	1.72			
	operator	N/A			
	unknown	No			
	method	The previous reporting documents set the Favourable Reference Area (FRA) at 1.76km2 on the basis of the area recorded during the Coastal Monitoring Project (Ryle et al. 2009) of 1.72km2 and the estimated loss of habitat since designation (2.72%). The degree of loss is likely to have been closer to that recorded during the SDM (0.47%), but the actual figure cannot be calculated on the basis of the information currently available. Assuming that the actual percentage loss lies somewhere between 0.47% and 2.72%, FRA is likely to be between 1.72 and 1.76 km2. However, it should be noted that this is a naturally dynamic habitat that is difficult to map accurately.			
2.4.13 Reason for change	Genuine				

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive grazing (A04.01)	low importance (L)	Nitrogen input (N)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	high importance (H)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	high importance (H)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
estuarine and coastal dredging (J02.02.02)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
Erosion (K01.01)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
fences, fencing (G05.09)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
intensive grazing (A04.01)	low importance (L)	Nitrogen input (N)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	high importance (H)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	high importance (H)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
fences, fencing (G05.09)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
estuarine and coastal dredging (J02.02.02)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
Erosion (K01.01)	high importance (H)	N/A

species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Elytrigia juncea

Leymus arenarius

2.7.2 Species method used	The assessment is based on surveys of a subset of the sand dune sites in Ireland. Species listed in 2.7.1, represent those that were deemed to provide the best indication of whether the habitat was present. The species wereselected following a literature review, taking into account the species listed in the Interpretation manual of European habitats, The JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés carried out in 2011 as part of the Sand Dunes Monitoring Project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Loss of area due to human activities was considered to represent a deterioration in the area assessment. Increases in area due to habitat restoration were considered to represent an improvement in the area assessment.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	As part of the monitoring programme for this habitat, a total of seven criteria were assessed, including typical species, presence of negative indicator species, non-native species and the health of the vegetation. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. See Delaney et al. (2013) for full list of structure and functions criteria assessed. Sand dune systems are dynamic systems and in some cases, the habitat may not fulfil all of the structure and functions criteria or the area might decrease for natural reasons which are not related to anthropogenic activities. Best expert judgement was used to allow for natural habitat variation. The apparent increase in area for this habitat was attributed to natural processes by the Sand Dune Monitoring Project (Delaney et al., 2013).In addition, they reported an actual loss of 0.8ha. On further examination this loss was the result of beach cleaning and is not considered to be a permanent loss of habitat. In view of this and the overall increase in the area of the habitat it was felt that an Unfavourable-Inadequate rating fin terms of Area was notjustified.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1.69	max	1.69
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Both	Enhance
Restoring coastal areas (4.4)	Recurrent	low importance (L)	Both	Enhance
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	low importance (L)	Both	Not evaluated
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	low importance (L)	Outside	Enhance

Field label	Note
Habitat code: 2110	
0.2 Habitat code	2110 Embryonic shifting dunes are low sand mounds (generally less than a metre high) occurring between the high tide mark and 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes). They are unstable habitats where wind-blown sand is common and they are still vulnerable to saltwater intrusion. They represent the initial phase of dune formation and typically form where sand gathers around salt-tolerant species such as Leymus arenarius and Elytrigia juncea. Other plants commonly found in 1210 such as Cakile maritima, Honckenya peploides and Salsola kali may also occur. They can be very short-lived habitats as they are subject to natural erosion processes and susceptible to removal by storms or high tides.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 2110 Embryonic Shifting Dunes distribution map. Supplementary information was gathered from local surveys by Meath, Dun Laoghaire and Fingal County Councils.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map
1.1.04 Additional distribution map	2110 Embryonic shifting dunes polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. Distribution of 2110 coincided with 106 10km2 grid squares. The distribution increased by five grid squares since 2007 due to natural fluctuations and improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. A set of 14 cells generated by the range tool was removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 118 of these sites supported embryonic dune habitat (2110). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 36 of the sites that supported embryonic dune habitat (2110), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2008) provided additional background information on the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This figure is derived from the range map referred to in 1.1.5.

Field label	Note
Habitat code: 2110	
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007), Moore and Wilson (1999) and Crawford at al., (1996) were used as the basis for the 2110 Embryonic Shifting Dunes distribution map. Supplementary information was gathered from local surveys by Meath, Dun Laoghaire and Fingal County Councils.This was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Fourteen cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The apparent increase in range is an artefact of the new method of calculating range which was used in 2012.
2.3.09 a) Favourable reference range - In km2	There is no evidence that range has changed since the Habitats Directive came into force.
2.3.10 c) Reason for change - use of different method	See 2.3.4.
2.4.01 Surface area	2110 was mapped at 36 of the 39 sites visited during the Sand Dunes Monitoring project (SDM) (Delaney et al., 2013). The area mapped by the SDM (90km2) was added to the area of 2110 Embryonic Shifting Dunes mapped at all of the other sites during the Coastal Monitoring Project (1.09 km2) to give a total surface area of 1.99km2. The vast majority of the habitat area is covered by these surveys, although additional area adjacent to golf clubs or at highly fragmented, modified, marginal habitats may have been overlooked. In view of the highly dynamic nature of this habitat and the difficulties associated with mapping it accurately this figure should be treated with some caution.
2.4.02 Year or period	Field surveys for 181 sites were carried out between 2004 and 2006 as part of the Coastal Monitoring Project (CMP) and follow up surveys were carried out at a sample of 39 sites between 2011 and 2012 as part of the Sand Dunes Monitoring project (SDM).
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring Project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). It is not possible to quantify the amount of loss which occurred in the years between 2001 and 2004.
2.4.05 Short-term trend - Trend direction	Total area has increased due to natural fluctuations. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. There has been anthropogenic loss of the habitat since the Coastal Monitoring Project, so trend is assessed as decreasing. 0.008 km2 of 2110 were lost at site 11 South Bull Island due to beach cleaning and dumping activities.
2.4.06 a) Short-term trend - Magnitude - Minimum	There has been a small documented amount of anthropogenic habitat loss (0.008km2) within the 39 sites revisited during the Sand Dunes Monitoring Project since the Coastal Monitoring Project. This equates to a total loss of 1.29% of the habitat area within the sites visited during the SDM. If it is assumed that there are no losses at sites outside those surveyed by the SDM then the recorded anthropogenic loss is equal to 0.47% of the total area of 2110 Embryonic shifting dunes in Ireland recorded in the Coastal Monitoring Project. This is taken as the minimum trend value.

Field label	Note
Habitat code: 2110	
2.4.06 b) Short-term trend - Magnitude - Maximum	There has been a small documented amount of anthropogenic habitat loss (0.008km2) within the 39 sites revisited during the Sand Dunes Monitoring Project since the Coastal Monitoring Project. This equates to a total loss of 1.29% of the habitat area within the sites visited during the SDM. If it is assumed that a similar percentage of loss has occurred at sites outside those surveyed by the SDM 1.29% is taken as the maximum trend value.
2.4.07 Short-term trend - Method used	Based on field survey and documented recording of field loss. It was only possible to compare areas recorded in 2011-2012 with habitat maps dating to 2004-2006 (see notes for 2.4.4).
2.4.13 a) Reason for change - genuine change?	The increase in area is due to natural processes of accretion and succession. Loss is due to dumping of the detritus from beach cleaning in the fore dunes at one site. Although this is a recorded loss, it is not considered permanent.
2.5 Main pressures	The main pressures experienced by embryonic dunes (2110) continue to be linked to interference with natural dynamics and sediment supply, as well as recreational activities and trampling. The top five pressures (ranked H) are: G01 Sport and leisure activities G05.01 Trampling, overuse J02.12.01 Sea defence or coast protection works K01.01 Erosion M01 Changes in abiotic conditions Embryonic dunes are very dynamic habitats that are often ephemeral or transient in nature. Many sites are subject to natural erosion processes and are susceptible to removal by storms or high tides. This is a normal part of the erosion and accretion cycle of dune systems. However, human activities such as recreation and sand extraction can accelerate this erosional process and become problematic. Erosion will not be a problem as long as the rate of accretion continues at a similar rate. However, sediment depletion can be caused by extraction of sand and gravel (both offshore and onshore). The construction of coastal protection works can also lead to sediment depletion either by altering the sediment flow along the shoreline and effectively cutting off the supply of sand to the beach itself, or by acting as a barrier between the beach ad the dunes. Other frequently recorded pressures include invasion and spread of buckthorn, which can be very difficult to eradicate once it becomes established and dumping of household waste. The erection of fencing at a number of sites to control pedestrains has often resulted in concentrating foot traffic along the fencelines and the creation of tracks. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including embryonic dunes.
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al., 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 2110 habitat were estimated by the surveyors on a site-by-site level. Negative impacts (pressures) were ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits.

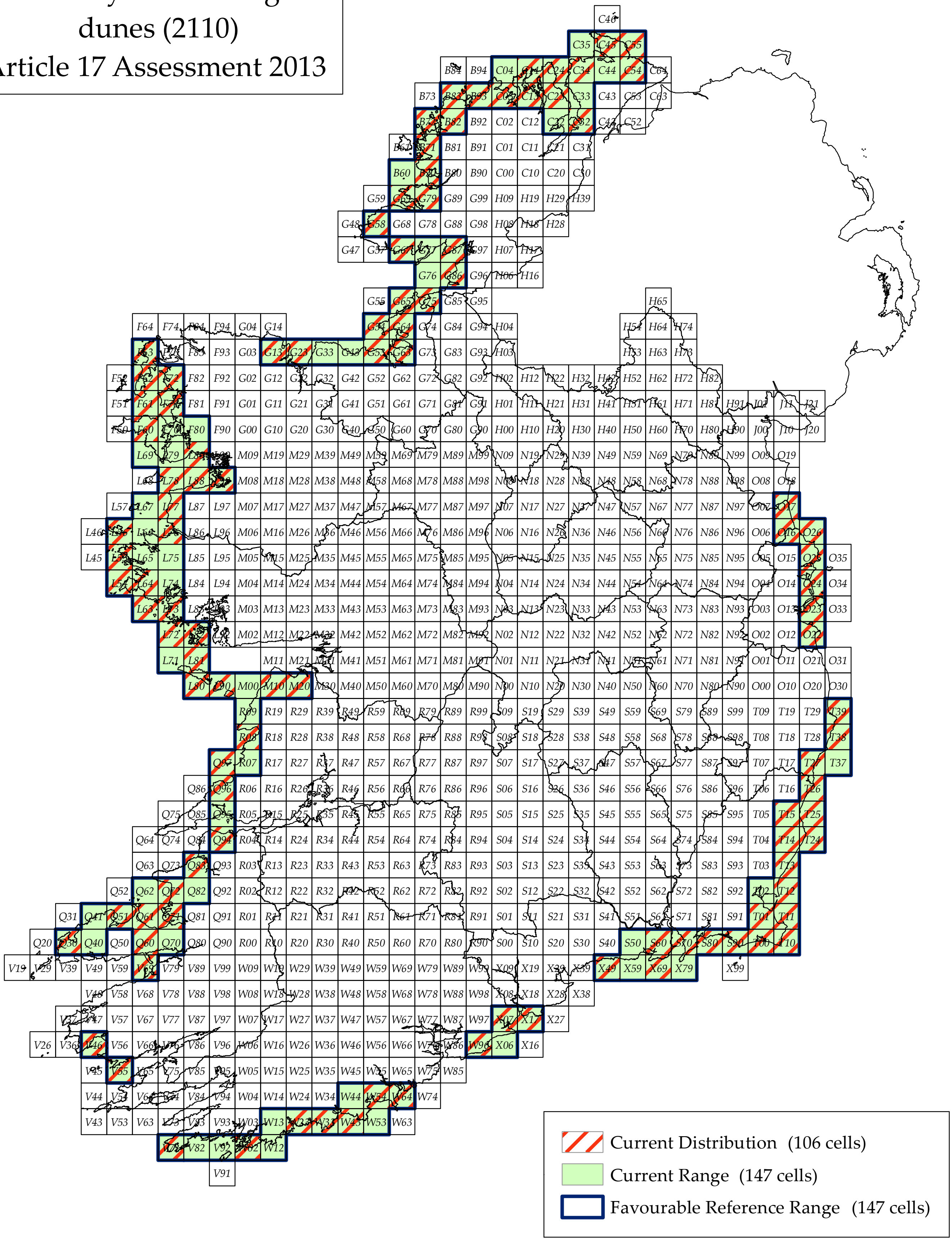
Field label	Note
Habitat code: 2110	
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy, 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats.
2.6.01 Method used - Threats	Refer to notes in Sections 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess structure & functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least one of the species listed in 2.7.1 in more than 40% of stops.
2.7.03 Justification of % thresholds for trends	Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Loss of area due to human activities was considered to represent a deterioration in the area assessment. Increases in area due to habitat restoration were considered to represent an improvement in the area assessment.
2.7.04 Structure and functions - Methods used	Embryonic dunes were mapped and assessed at 36 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded embryonic dune habitat from 118 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents 30% of the known sites, but over 36% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. As part of the monitoring programme a total of seven criteria were used to assess the structure and functions of 2110, including typical species, presence of negative indicator species, non-native species and the health of the vegetation. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 2110 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.

Field label	Note
Habitat code: 2110	
2.7.05 Other relevant information	86.7% of the habitat was assessed as being in Favourable condition and 13.3% in an unfavourable condition, corresponding to an assessment of Unfavourable-Inadequate. The criteria which failed most frequentlywere 'damage due to disturbance' and 'interference with sediment dynamics'. 2110 was affected by non-native invasive species at one site.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is taken to be the favourable reference range as it does not appear to have decreased since designation and is considered adequate to retain the regional diversity of the habitat in Ireland.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although the overall area of the habitat in sites revisited during the Sand Dunes Monitoring project has increased since the Coastal Monitoring Project (Ryle et al. 2009), there has been a documented loss of habitat as a direct result of human activities at one site. The amount of anthropogenic loss is estimated at 0.47% since 2004, which is a loss of less than 1% of the total habitat per year since 2004. However, this loss is not considered significant as it is not a permanent loss and the habtiat has increased nationally. Reliable data for assessing area was not available for the period prior to 2004 (see 2.4.4).
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Trend is declining as losses are continuing in this habitat. However, the loss is not sufficient to indicate that the habitat will be assessed as Unfavourable-Bad in the foreseeable future.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The percentage area of 2110 Embryonic shifting dunes in Favourable condition (86.7%) was greater than 75% but less than 99%, so area was assessed as Unfavourable-Inadequate (see 2.7.4 for explanation of threshold values). The criteria which failed most frequently assessed changes to the sediment dynamics and damage due to disturbance. The criterion assessing presence of non-native species failed in the assessment of one site.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In 2007, 91% of the area was assessed as Favourable and 9% was assessed as Unfavourable-Inadequate or Unfavourable-Bad. Only 9 of 254 monitoring stops failed (3.5%). The current survey indicated that 87% of the habitat was in Favourable condition with the remainder of the habitat being assessed as Unfavourable. This apparent deterioration is most likely to be related to changes in the methodology to include an assessment of interference with sediment availability and disturbance, rather than a genuine deterioration. There is evidence that disturbance was occurring at sites prior to 2007. The trend is considered to be stable.

Field label	Note
Habitat code: 2110	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". A total of 15 threats were recorded in 2110 Embryonic shifting dunes by Delaney et al. (2013) and NPWS rangers. 1 was of "High importance (H)" and 4 were of "Medium importance (M)". Disturbance and interference with sediment dynamics are the main threats for this habitat. Currently, there no measures on a national level and few to no measures on a site level in place to prevent problems associated with interference with sediment dynamics or disturbance. This suggests that the future trends for the range, area and structure and functions parameters are declining. As none of the parameters have borderline assessments however, none are predicted to decline to the extent that there will be a change in their future status. Future Prospects were therefore assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	There has been no change in the future prospects assessment and the main impacts listed here are similar to those specified in the 2007 assessment. The trend for future prospects is stable.
2.8.05 Overall assessment of Conservation Status	Range was assessed as Favourable as there has been no loss since implementation of the Habitats Directive. All of the other parameters were assessed as Unfavourable-Inadequate. Area was assessed as Unfavourable-Inadequate (declining) because losses continued to occur in the period 2004-2012, but the total loss of habitat recorded in 2011-2012 was equal to less than 1% per year since the Coastal Monitoring Project. Structure and functions were assessed as Unfavourable-Inadequate (stable). The structure and functions of 86.7% of the area of 2110 Embryonic shifting dunes were in Favourable condition. The criteria which failed most frequently in the remaining 13.3% of the habitat assessed changes to the sediment dynamics and damage due to disturbance. The criterion assessing presence of non-native species failed in the assessment of one site. Although the area in Unfavourable condition appeared to have increased since the Coastal Monitoring Project, this is thought to be related to changes in the monitoring methodology rather than being a genuine deterioration, so the trend was stated to be stable. Future prospects were assessed as Unfavourable-Inadequate (stable). The most serious threats to the habitat were associated with recreation and coastal defences, and these were consistent with the structure and functions assessment results. Five impacts of high and medium importance were recorded, and these impacts continue to have an effect. 2110 was assessed as Unfavourable-Inadequate in 2013.
2.8.06 Overall trend in Conservation Status	The trend for the overall assessment was assessed as declining because of the continued loss of Area.

Field label	Note
Habitat code: 2110	
3.1.01 a) Surface area - Minimum	Most of the habitat (1.13 km2) within the Natura 2000 network is found at sites where it is listed as a QI, but 0.56 km2 was present within sites where 2110 is not listed as a QI.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value = max value.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring (SDM) project were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2120 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas.
3.1.03 Trend of surface area within the network	Loss of habitat occurred within the SAC network.
3.2 Conservation measures	Efforts have been made to restore some coastal areas after exploitation for agriculture or tourism, and these have had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Anthropogenic impacts and loss of habitat would indicate that further measures are required that are not currently being implemented. In particular, implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. Depletion of sediment supply has been reduced as marine sediment deposits are protected and extraction of Maerl deposits is permitted only under licence.

Embryonic shifting dunes (2110)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2120

NAME: Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Anon (2010). Meath Wetlands and Coastal Habitats Survey. Report prepared for Meath County Council and The Heritage Council

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Foss, P.J., Crushell, P. & O'Loughlin, B. & Wilson, F. (2012) Title: Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council. pp. 107

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Power, G. (2011a). Dungarvan habitat Survey. Report prepared for Waterford County Council.

Power, G. (2011b). Tramore habitat Survey. Report prepared for Waterford County Council.

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring

Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Wilson, F. and Foss, P.J. (2011). The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council

County Council Geographic Information from Fingal, Dun Laoghaire-Rathdown and Mayo and County Councils.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	15300	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	15300
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Habitats Directive came into force.
2.3.10 Reason for change	Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	3.33				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.05	max		confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	4.02			
	operator	N/A			
	unknown	No			
	method	The favourable reference area (FRA) quoted in 2007 was 4.95km2. It was calculated by adding the area mapped during the Coastal Monitoring Project (CMP) (4.06km2) and the area estimated to have been lost between 1994 and 2004-2006 (18.02% or 0.89km2). However, the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013) determined that the CMP had overestimated the area of 1220 by a factor of 1.4% from their survey of a subset of 39 sites. Assuming that the habitat was consistently overestimated during the CMP by 1.6% the original figure should have been 3.99 km2 (if the habitat was over-recorded by 1.6% on average at all sites during			

the CMP) and 4.02 km2 (if the over-recording was limited to the sites resurveyed during the SDM). At a minimum a 1.4% loss restricted to the SDM sites would mean the original area should have been 4.06km2.

Based on the SDM findings the area of loss in 2007 could have been between 0.05% and 18.02%. Therefore, FRA is likely to be between 4.02km2 and 4.74km2. The FRA is set at the lower of these two values. However, it should be noted that this is a naturally dynamic habitat that is difficult to map accurately.

2.4.13 Reason for change	Genuine

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive grazing (A04.01)	medium importance (M)	Nitrogen input (N)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	high importance (H)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	high importance (H)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
fences, fencing (G05.09)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
estuarine and coastal dredging (J02.02.02)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
Erosion (K01.01)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
intensive grazing (A04.01)	medium importance (M)	Nitrogen input (N)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	high importance (H)	N/A

Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	high importance (H)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	medium importance (M)	N/A
fences, fencing (G05.09)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
estuarine and coastal dredging (J02.02.02)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	high importance (H)	N/A
Erosion (K01.01)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Ammophila arenaria

Elytrigia juncea

Leymus arenarius

2.7.2 Species method used	2.7.1 lists the selection of species that were deemed to provide the best indication of whether habitat was present. The species were selected following a literature review, taking into account the species listed in the Interpretation manual of European habitats, the JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés carried out in 2011 as part of the Sand Dunes Monitoring Project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	Most of the change in area since the assessment in 2007 is the result of natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Loss of area due to human activities was considered to represent a deterioration in the area assessment. Increases in area due to habitat restoration were considered to represent an improvement in the area assessment.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Presence of negative indicator species, non-native species and the health of the vegetation were recorded. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was recorded where relevant. See Delaney et al. (2013) for full list of structure and functions criteria assessed. Sand dune systems are highly dynamic systems and in some cases, the habitat may not fulfill all of the structure and functions criteria or the area might decrease for natural reasons which are not related to anthropogenic activities.

The methodology sought to allow for natural habitat variation, but in some cases expert judgement was used in the assessment.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	2.9	max	2.9
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Both	Enhance
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	low importance (L)	Both	Not evaluated
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Restoring coastal areas (4.4)	Recurrent	low importance (L)	Outside	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Recurrent	low importance (L)	Outside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 2120	
0.2 Habitat code	2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) are dunes which are partly stabilised and are dominated by Ammophila arenaria. They tend to be taller than 2110 Embryonic shifting dunes and form further inland from these. The dunes are actively created by Ammophila arenaria, which traps sand, and vegetation cover is incomplete (Fossitt, 2000). The dunes can build and erode quickly because of the presence of bare sand, and they are sometimes referred to as mobile dunes.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the 2120 distribution map. Supplementary information was gathered from sources listed in 2.2.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map
1.1.04 Additional distribution map	2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. The distribution of 2120 coincides with 108 10km2 grid squares. A single additional grid square was added to the distribution map in 2013, and this was due to improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. A subset of 18 cells generated by the range tool were removed as the cells do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 141 of these sites supported mobile dune habitat (2120). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 36 of the sites that supported mobile dune habitat (2120), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2008) provided additional background information on the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007), Moore and Wilson (1999) and Crawford at al. (1996) were used as the basis for the 2120 Shifting dunes along the shoreline with Ammophila arenaria. Supplementary information was gathered from sources listed in 2.2 and the final distribution was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Eighteen cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.

Field label	Note
Habitat code: 2120	
2.3.03 Short-term trend - Period	Evans and Arvela (2011) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The increase in range is due to a change in the methodology and improved knowledge. Most of the difference in range is due to the use of the range tool, and only one grid square was added as a result of improved knowledge.
2.3.09 a) Favourable reference range - In km2	See 2.3.9d.
2.3.10 c) Reason for change - use of different method	See 2.3.4.
2.4.01 Surface area	The area mapped at sample sites during the Sand Dunes Monitoring project (1.60km2) was added to the area of 2120 Marram Dunes mapped at all of the other sites during the Coastal Monitoring Project (CMP) (1.73Km2) to give a total area of 3.33km2. No point data were included. The vast majority of the habitat area is covered by these surveys, although additional areas adjacent to golf clubs were not considered. Highly fragmented, modified and marginal habitats may have been overlooked. The area mapped during the CMP (4.06 km2) was found to have been overestimated by 1.4% when 39 of the sites were resurveyed during the Sand Dunes Monitoring project (SDM) in 2011-2012. The overestimation was not consistent across all of the sites assessed during the SDM so it should not be assumed that the area of the habitat at all sites was overestimated during the CMP. If the overestimate within the sample of thirty-nine sites was replicated in all of the other sites assessed during the CMP, then the total surface area would be 4 km2.
2.4.02 Year or period	Field surveys were carried out at 181 sites between 2004 and 2006 as part of the Coastal Monitoring Project and follow up surveys were carried out at a sample of 39 sites between 2011 and 2012 as part of the Sand Dunes Monitoring project.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based on a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). It is not possible to estimate the amount of loss which occurred in the years between 2001 and 2004. The loss of 2.72% since implementation of the Habitats Directive which was reported in 2007 was not based on any clear evidence andmay have included habitat loss due to natural processes.
2.4.05 Short-term trend - Trend direction	Most of the change in area since the assessment in 2007 is the result of natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. 0.002 km2 was lost as a direct result of human activities within the 39 sites revisited during the Sand Dunes Monitoring Project (SDM). The habitat loss resulted from trampling at Site 64 Barley Cove and beach cleaning activities at Site 11 South Bull Island.
2.4.06 a) Short-term trend - Magnitude - Minimum	The habitat has shrunk from 4.02 km2 to 3.34 km2 between 2007 and 2012. Most of this loss is the result of the natural dynamism of coastal habitats. Within the 39 sites revisited during the Sand Dunes Monitoring Project, 0.002 km2 was lost since the Coastal Monitoring Project as a direct result of human activities. 0.0002 km2 is equal to loss of 0.09% of the habitat within the sample of 39 sites resurveyed as part of the SDM. This is a loss of 0.05% nationally since the Coastal Monitoring Project.

Field label	Note
Habitat code: 2120	
2.4.07 Short-term trend - Method used	Based on field surveys of 181 sites in 2004 - 2006 for the Coastal Monitoring Project and resurveys of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012.
2.4.13 a) Reason for change - genuine change?	The genuine change in area was greater than the change in area due to improved knowledge, so 2.4.13a was selected. Losses were partly due to natural processes of erosion and succession and partly due to anthropogenic influences.
2.5 Main pressures	The main pressures experienced by mobile dunes (2120) continue to be linked to interference with natural dynamics and sediment supply, as well as recreational activities and trampling. The main pressures experienced by embryonic dunes (2110) continue to be linked to interference with natural dynamics and sediment supply, as well as recreational activities and trampling. The top five pressures (ranked H) are: G01 Sport and leisure activities G05.01 Trampling, overuse J02.12.01 Sea defence or coast protection works K01.01 Erosion M01 Changes in abiotic conditions Mobile (marram) dunes are very dynamic habitats that are often ephemeral or transient in nature. Many sites are subject to natural erosion processes and are susceptible to removal by storms or high tides. This is a normal part of the erosion and accretion cycle of dune systems. However, human activities such as recreation and sand extraction can accelerate this erosional process and become problematic. Erosion will not be a problem as long as the rate of accretion continues at a similar rate. However, sediment depletion can be caused by extraction of sand and gravel (both offshore and onshore). The construction of coastal protection works can also lead to sediment depletion either by altering the sediment flow along the shoreline and effectively cutting off the supply of sand to the beach itself, or by acting as a barrier between the beach ad the dunes. Other frequently recorded pressures include invasion and spread of buckthorn, which can be very difficult to eradicate once it becomes established and dumping of household waste. The erection of fencing at a number of sites to control pedestrains has often resulted in concentrating foot traffic along the fencelines and the creation of tracks. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including embryonic dunes.
2.5.01 Method used - pressures	Actual impact data from the Sand Dunes Monitoring survey of 2011-2012 (Delaney et al., 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 2120 habitat were estimated by the surveyors on a site-by-site level. Negative impacts (pressures) were ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. Two additional information sources were used. SIR data on impacts noted in protected areas recorded by NPWS rangers and data from the Foreshore Deed Book were examined for other potential pressures not picked up on during the monitoring survey. Both of these sources confirmed the validity of the results of the Sand Dunes Monitoring survey.

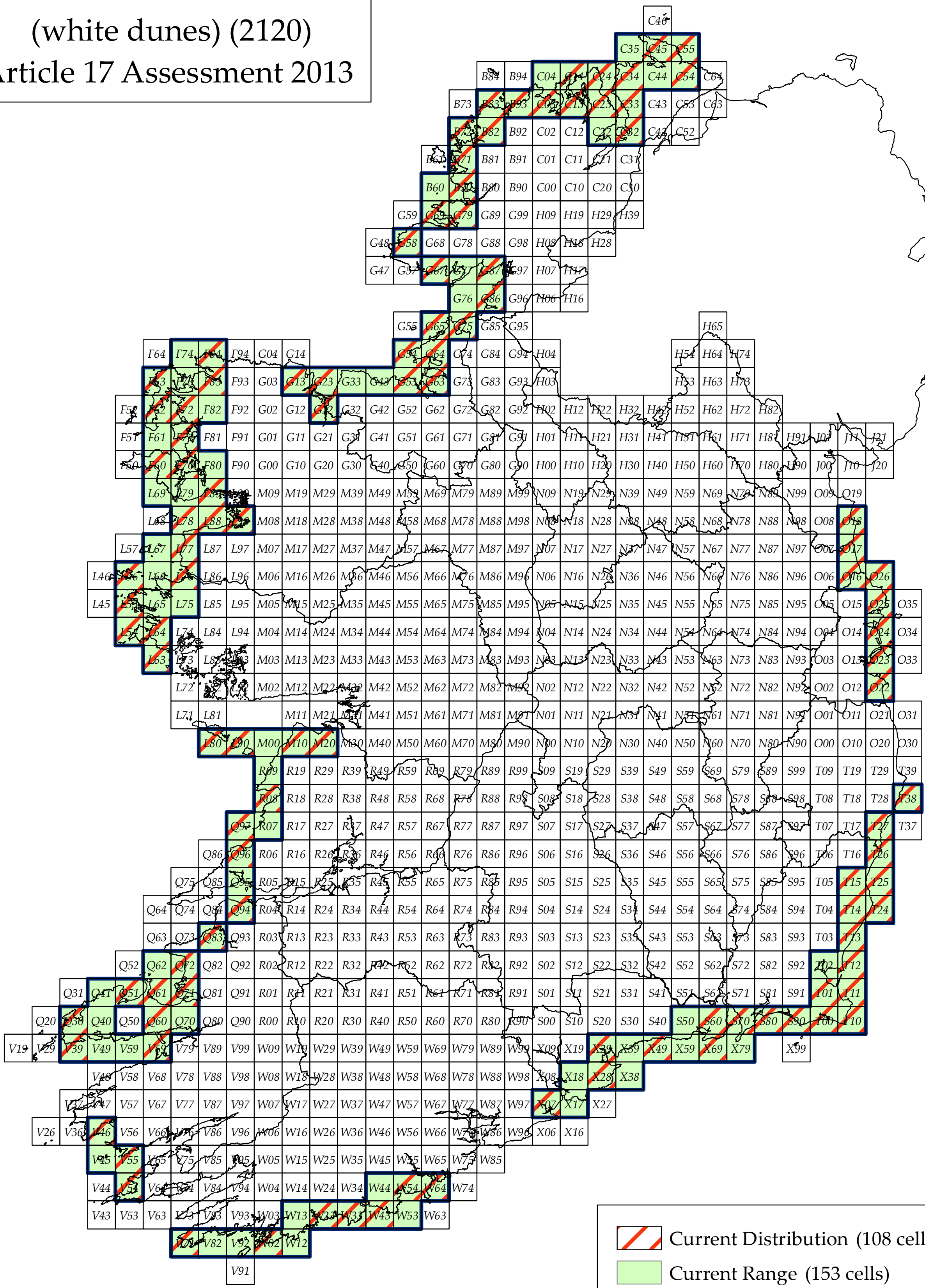
Field label	Note
Habitat code: 2120	
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures, the list is the same for threats, with the addition of climate change. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess structure and functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least one species listed in 2.7.1 present in more than 40% of stops.
2.7.04 Structure and functions - Methods used	Fixed dunes were mapped and assessed at 36 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded mobile dune habitat from 141 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents approximately 25% of the known sites, but over 57% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. In total, seven criteria were considered in the structure and functions assessment. As well as typical species, presence of negative indicator species, non-native species and the health of the vegetation were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 2120 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.
2.7.05 Other relevant information	90% of the habitat was assessed as being in Favourable condition in 2013. This corresponds to an assessment of Unfavourable-Inadequate. The criteria which failed most frequently assessed damage due to disturbance and interference with sediment dynamics. 2120 was affected by non-native invasive species at one site.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is equal to the Favourable Reference Range as it does not appear to have decreased since implementation of the Habitats Directive and is adequate to retain the regional diversity of the habitat in Ireland.

Field label	Note
Habitat code: 2120	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The amount of anthropogenic loss is estimated at 0.05% since 2004, which is a loss of less than 1% per year since 2004, therefore Area is assessed as Unfavourable-inadequate. Reliable data for assessing area was not available for the period prior to 2004 (see 2.4.4).
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Area was assessed as Unfavourable-Bad in 2007. However, that assessment was purely indicative as it was not based on a known area of habitat loss. A loss of 0.05% since 2004 is not considered significant for such a naturally dynamic habitat, therefore the qualifier is set as stable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	90% of the habitat was assessed as being in Favourable condition. This corresponds to an assessment of Unfavourable-Inadequate (see 2.7.4 for explanation of threshold values). The criteria which failed most frequently assessed damage due to disturbance and interference with sediment dynamics. 2120 was affected by non-native invasive species at one site.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In 2007 structure and functions were assessed as Unfavourable-Bad. 61% of the habitat was rated Favourable, although 83.2% of the monitoring stops were assessed as Favourable. The most frequent reason for a stop to fail was because of unhealthy vegetation. Some of the monitoring stops where the vegetation was unhealthy were likely to be undergoing natural stabilisation or erosion processes, and would not have been assessed as Unfavourable under the current methodology. After consulting the backing document for the 2007 assessment and studying aerial photographs and individual site reports for 39 sites surveyed in 2007, the change in status was considered to be the result of a change in methodology, rather than from genuine improvement. The trend was assessed as stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), future prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". 2120 has a total of 16 threats recorded by Delaney et al. (2013) and NPWS rangers. 2 were of "High importance (H)" and 5 were of "Medium importance (M)". Disturbance, interference with sediment dynamics and non-native invasive species are the main threats for this habitat. Currently, there no measures on a national level and few to no measures on a site level in place to prevent problems associated with interference with sediment dynamics, disturbance or non-native invasive species. This suggests that the future trends for the range, area and structure and functions parameters are declining. None of the parameters have a borderline assessment however, and they are not predicted to decline to the extent that there will be a change in their future status. Future prospects were therefore assessed as Unfavourable-Inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future Prospects were assessed as Unfavourable-Bad in the last reporting period. This appraisal was based on assessments of area and structure and functions which were harsher than would have been made under the current methodology. The qualifier assigned to Future Prospects for this reporting period is 'stable' because the habitat is not believed to have deteriorated significantly since 2007.

Field label	Note
Habitat code: 2120	
2.8.05 Overall assessment of Conservation Status	The current range is equal to the favourable reference range as it does not appear to have decreased since implementation of the Habitats Directive and is adequate to retain the regional diversity of the habitat in Ireland. Range was assessed as Favourable. Area was assessed as Unfavourable-Inadequate (stable) because losses have occurred in the period 2004-2012, the total loss of habitat recorded in 2011-2012 was equal to less than 1% per year since the Coastal Monitoring Project. Structure and functions were assessed as Unfavourable-Inadequate (stable). The structure and functions of 90% of the area of 2120 were in Favourable condition. The criteria which failed most frequently in the remaining 10% of the habitat assessed damage due to disturbance and interference with sediment dynamics. The criterion assessing presence of non-native species failed in the assessment of one site. Although the area in Unfavourable condition appeared to have decreased since the Coastal Monitoring Project, this is thought to be related to changes in the monitoring methodology rather than being a genuine deterioration, so the trend was stated to be stable. Future prospects were assessed as Unfavourable-Inadequate (stable). The most serious threats to the habitat were associated with recreation and coastal defences, and these were consistent with the structure and functions assessment results. Seven impacts of high and medium importance were recorded, and these impacts continue to affect the habitat. These are expected to prevent the habitat from recovering at some sites, while they are likely to cause further deterioration at others. The conservation status of 2120 was assessed as Unfavourable-Inadequate.
2.8.06 Overall trend in Conservation Status	The qualifier for the overall assessment is set as stable. Although there have been minor losses, these are not considered significant in such naturally dynamic habitat. Most of the changes recorded since 2007 are due to improved knowledge and intensive surveys.
3.1.01 a) Surface area - Minimum	The total area of 2120 which is located within the Natura 2000 network is 2.90 km2. Of this, 1.04 km2 occurs at sites where 2120 is listed as a QI and 1.86 km2 occurs within an SAC but is not listed as a QI.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value=max value.

Field label	Note
Habitat code: 2120	
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring project (SDM) were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2120 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas. The area mapped during the CMP (4.06 km2) was found to have been overestimated by 1.6% when 39 of the sites were resurveyed during the SDM in 2011-2012. The overestimation was not consistent across all of the sites assessed during the SDM, so assuming that sites which were not visited during the SDM were overestimated by 1.6% is not a reliable way to estimate their surface area. Further, it is possible that habitats within SACs were surveyed in more detail and were less disturbed than areas outside of SACs, and both of these factors affect how accurately the habitat was mapped. The figure of 2.89 km2 presented in 3.1 is the most accurate figure that could be derived, but it may represent a slight overestimation.
3.1.03 Trend of surface area within the network	Loss has occurred within the Natura 2000 network.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Work has progressed to restore some coastal areas after exploitation for agriculture or tourism, and this has had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat.

Marram dunes (white dunes) (2120) Article 17 Assessment 2013



Current Distribution (108 cells)

Current Range (153 cells)

Favourable Reference Range (153 cells)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta

Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2130

NAME: Fixed coastal dunes with herbaceous vegetation (“grey dunes’)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Anon (2010). Meath Wetlands and Coastal Habitats Survey. Report prepared for Meath County Council and The Heritage Council

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on ‘Ireland at Risk’, for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Power, G. (2011a). Dungarvan habitat Survey. Report prepared for Waterford County Council.

Power, G. (2011b). Tramore habitat Survey. Report prepared for Waterford County Council.

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Wilson, F. and Foss, P.J. (2011). The County Wicklow Wetland Survey. Report

prepared for Wicklow County Council and The Heritage Council.

Geographical information supplied by NPWS including data from Fingal and Mayo County Councils

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	15900	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	15900
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Habitats Directive came into force. The apparent change in range is an artefact of the new method of calculating range which was used in 2012.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	72.8				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	increase (+)				
2.4.6 Short-term trend magnitude	min	1.7	max		confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	69.86			
	operator	N/A			
	unknown	No			
	method	The Sand Dunes Monitoring project (SDM) mapped fixed dune habitat from 36 of the 39 sites that were revisited in 2011-2012 (Delaney et al. 2013). The SDM data was compared to the data produced for the same sites during the Coastal Monitoring Project (CMP) (Ryle et al. 2009). It was determined that the area of this habitat had been over-estimated during the CMP by approximately 3.2%. Based on the assumption that this over-estimation is representative of the entire CMP survey, the original national area submitted in 2007 of 7058ha is reduced by 3.2% to give a revised national area for 2007 of 6832ha (68.32km2). Losses of 3.2% were recorded during the CMP which means that the FRA should have been set at 6896ha (69.86km2). This is now used as the revised FRA			

but this figure may be further revised in light of additional survey work.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Forest and Plantation management & use (B02)	low importance (L)	Acid input/ acidification (A)
Trampling, overuse (G05.01)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Erosion (K01.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Forest and Plantation management & use (B02)	low importance (L)	Acid input/ acidification (A)
Trampling, overuse (G05.01)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A

sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Erosion (K01.01)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Agrostis capillaris
Aira praecox
Anthyllis vulneraria
Carex arenaria
Carex flacca
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 sens. lat.
Polygala serpyllifolia
Potentilla erecta
Rhinanthus minor
Rhytidiadelphus squarrosus
Rhytidiadelphus triquetrus
Scleropodium purum
Sedum acre
Syntrichia ruraliformis
Thymus polytrichus
Trifolium repens
Veronica chamaedrys
Viola canina
Viola riviniana
Viola tricolor

2.7.2 Species method used	Species listed in 2.7.1 represent the selection of species that were deemed to provide the best indication of whether the habitat was present. The species were selected following a literature review, taking into account the species listed in the Interpretation manual of European habitats, the JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés collected in 2011 as part of the Sand Dunes Monitoring Project (Delaney et al., 2013). The list reflects the various sub-communities and regional variations within this habitat.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	In total, 11 monitoring criteria were assessed, including typical species, the occurrence of negative indicator species, non-native species, tree and scrub cover, invasion by adjacent conifer plantations, bare ground cover, vegetation height, flowering and fruiting, alterations to sediment dynamics and damage due to disturbance. See Delaney et al. (2013) for full list of structure and functions criteria assessed. Sand dune systems are naturally dynamic and in some cases, the habitat may not

fulfil all of the structure and functions criteria or the area might decrease for natural reasons which are not related to anthropogenic activities. The methodology sought to allow for natural habitat variation, but in some cases expert judgement was used in the assessment.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	62.76	max	62.76
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent	low importance (L)	Both	Unknown
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	low importance (L)	Both	Unknown
Restoring coastal areas (4.4)	Recurrent One-off	low importance (L)	Inside	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Specific single species or species group management measures (7.4)	Recurrent	low importance (L)	Both	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	low importance (L)	Outside	Enhance

Field label	Note
Habitat code: 2130	
0.2 Habitat code	Fixed dunes refers to the more stabilised areas of dune systems located inland from the mobile dune habitats (2110 and 2120), where the wind speed is reduced and the vegetation is removed from the influence of tidal inundation and salt spray. As this area is relatively sheltered, sand mobility is greatly reduced in comparison to the mobile dune habitats, leading to the development of a more or less closed or 'fixed' carpet of vegetation. Regional variations are evident and are determined by a combination of geomorphologic, edaphic, climatic and anthropogenic factors. Species diversity and plant distribution in fixed dunes (2130) is strongly controlled by a range of factors, including grazing intensities, moisture gradients, nutrient gradients and human disturbance. This has led to the recognition of a number of sub-communities within this habitat type (Gaynor, 2008). On relatively recently developed sites, such as those found at Bull Island, Co. Dublin, or on sites composed of sand with a high shell fragment content, such as on many Irish west coast sites, the substrate remains relatively calcium-rich. On these calcareous sites the vegetation supports a number of calcicoles, including Centaurium erythraea, Anthyllis vulneraria, Trifolium campestre, T. arvense, Anacamptis pyramidalis, Echium vulgare, Blackstonia perfoliata and Carlina vulgaris. Where there is a considerable calcium carbonate content, particularly along the west coast, Asperula cynanchica, Koeleria macrantha and Arabis hirsuta can be found in abundance. On siliceous sites (i.e. where the sediment is principally derived from local rock), or on old dune systems where leaching over a long period of time has led to decalcification of the surface layers, the vegetation can have a modest contingent of calcifuges, including Festuca rubra, F. ovina, Agrostis capillaris, Anthoxanthum odoratum, Helictotrichon pubescens, Galium saxatile, Luzula campestris, Dicranum scoparium, Hylocomium splendens and Pleurozium schreberi. Cladonia lichens can become locally abundant, particularly where rabbits are active. In slightly more open situations, where patches of bare sand are present, a community with a high frequency of Syntrichia ruraliformis is found. This sand-binding moss is often found in association with a range of dune annuals including Aira praecox, Catapodium marinum, C. rigidum, Erophila verna and Vulpia fasciculata. This sub-community requires the natural dynamism of dune systems to be maintained and is lacking on over-stabilised sites. Where grazing levels have been significantly reduced a scrub community dominated by Rosa pimpinellifolia can occur. Grazing helps to maintain an open species-rich fixed dune vegetation and prevents 2130 from developing into scrub vegetation. For detailed descriptions of the vegetation and flora of Irish fixed dunes see
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the 2130 distribution map. Supplementary information was gathered from sources listed in 2.2.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map

Field label	Note
Habitat code: 2130	
1.1.04 Additional distribution map	2130 Fixed dunes with herbaceous vegetation (grey dunes) polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. The final distribution of this habitat covers 113 grid squares. A comparison with the distribution map submitted in 2007 reveals that two new grid squares were added due to improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. A set of 17 cells generated by the range tool was removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 152 of these sites supported fixed dune habitat (2130). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 36 of the sites that supported fixed dune habitat (2130), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2008) provided additional background information on the habitat and the geographical variation within the vegetation communities. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al. (1996) were used as the basis for the distribution map for 2130 fixed grey dunes with herbaceous vegetation. Supplementary information was gathered from sources listed in 2.2 and the final distribution was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Seventeen cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: “The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this”.
2.3.04 Short term trend - Trend direction	The increase in range is due to a change in the methodology and improved knowledge. Most of the difference in range is due to the use of the range tool.
2.3.09 a) Favourable reference range - In km2	The favourable reference range has been set as the current range as there is no evidence of decline since the Habitats Directive came into force.
2.3.10 c) Reason for change - use of different method	There is no evidence of change since the Habitats Directive came into force. The apparent change in range is primarily an artefact of the new range tool.

Field label	Note
Habitat code: 2130	
2.4.01 Surface area	The Sand Dunes Monitoring (SDM) project mapped fixed dune habitat from 36 of the 39 sites that were revisited in 2011-2012. The total area mapped was 3349ha. The SDM data was compared to the data produced for the same sites for the CMP. It was determined that the area of this habitat had been over-estimated by approximately 3.2%. Based on the assumption that this overestimation is representative of the entire survey, the original national area submitted in 2007 is reduced by 3.2% to give a revised national area for 2007 of 6832ha (68.32km2). The Coastal Monitoring Project (CMP) recorded fixed dune habitat from 152 sites (Ryle et al 2009), giving an estimated total area of 7058ha. The subset of sites assessed by the SDM represents almost 24% of the known sites, but this actually covers 46% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. The current national area of 2130 fixed dunes with herbaceous vegetation was estimated by extrapolation from data in the SDM (Delaney et al 2013). The area surveyed (3349ha) represented 46% of the CMP habitat. Multiplying this figure would give a total figure of 7280ha. These figures should be treated with some caution as they are estimates based on extrapolation. It is also known that some fixed dune habitat, including areas within golf courses have been excluded from both sets of data. However, based on the best possible information available it appears that the area of 2130 fixed dune habitat is approximately 7280ha (72.8km2). The polygons mapped by Delaney et al. 2013 are as true as possible a representation of the size and shape of the habitat on the ground.
2.4.02 Year or period	Baseline field surveys were carried out at 181 sites (152 sites with 2130 fixed dune habitat) between 2004 and 2006 as part of the Coastal Monitoring Project (Ryle et al . 2009). Monitoring surveys were carried out at a sample of 39 sites (36 with 2130 fixed dune habitat) between 2011 and 2012 as part of the Sand Dunes Monitoring project (Delaney et al. 2013).
2.4.05 Short-term trend - Trend direction	Although there has been a small loss of habitat caused by anthropogenic factors, the total area has actually increased. Therefore the trend is increasing.
2.4.06 a) Short-term trend - Magnitude - Minimum	The SDM recorded an increase in area of 1.24km2 and a loss in area of 0.03km2 to give a net increase of 1.21km2. This represents an increase of approximately 1.7%.
2.4.13 a) Reason for change - genuine change?	There has been a genuine increase in the habitat area of 1.24 km2 due to natural processes of accretion and stabilisation, as well as loss of 0.09% of the habitat (0.03km2) due to human activities since the Coastal Monitoring Project. This has resulted in a net gain of 1.66% or 121ha.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	There has been a net increase in the area of 2130 habitat due to improved knowledge and mapping following intensive survey work (Delaney et al. 2013).

Field label	Note
Habitat code: 2130	
2.5 Main pressures	Of all the dune habitats, fixed dunes tend to have the greatest number of recorded impacts. This may be partly due to the area they occupy and because they are more stable than the frontal areas and are under constant pressure from a number of sectors. The main pressures on fixed dunes continue to be linked to agriculture, recreation and interference with natural dynamics. Many sites have been modified in the past for developments such as sports pitches, golf courses, caravan parks, coniferous plantations, housing, roadways and airstrips. The top five pressures (ranked H) are: A04.01 Intensive grazing A04.03 Abandonment of pastoral systems, lack of grazing G02 Sport and leisure structures I01 Invasive non-native species M01 Changes in abiotic conditions Perhaps the greatest impacts relate to inappropriate grazing regimes. Intensive grazing or overgrazing can lead to a reduction in species diversity, nutrient enrichment of the soil and destruction of the vegetation cover. Undergrazing or lack of grazing associated with land abandonment can be equally negative as it leads to development of species-poor grassland and eventually to scrub encroachment. Recreation remains a pressure on most sites in some form and G01 which relates to outdoor sports and leisure activities including walking, horseriding, off-road vehicles etc. could just as easily have been given a high rating as G02, which includes golf courses, sports pitches and caravan parks, although the intensity of the impacts tend to be higher than for G01. The introduction on non-native species, particularly buckthorn (Hippophae rhamnoides) remains a problem on many sites, particularly along the east coast. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including fixed dunes.

Field label	Note
Habitat code: 2130	
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al. 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 2130 habitat were estimated by the surveyors on a site-by-site level. Pressures noted during the Coastal Monitoring Project (Ryle et al. 2009) from sites other than those covered by the SDM were included where these were thought to be be continuing. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits. Expert judgement was used to assess pressures that may have been overlooked in the field and to group pressures noted into the relevant codes. Negative impacts (pressures) were subsequently ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 2130 Fixed dunes with herbaceous vegetation (grey dunes) habitat nationwide were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. The top five ranking pressures were determined through a combination of the ranking system and expert judgement.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats.Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell, 2009; Fealy and Murphy, 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats. The presence of coastal protection works will impact on dune habitats by (a) effectively cutting off the dunes from the beach, resulting in over-stabilisation of these naturally dynamic systems and (b) reducing the opportunity for new dune habitat formation.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess structure and functions of the habitat. 2.7.1 lists the selection of species that were deemed to provide the best indication of whether habitat was present. Assessment was on the basis of the presence of at least eight of the species listed in over 20% of the monitoring stops and a minimum of four species present in any stop.

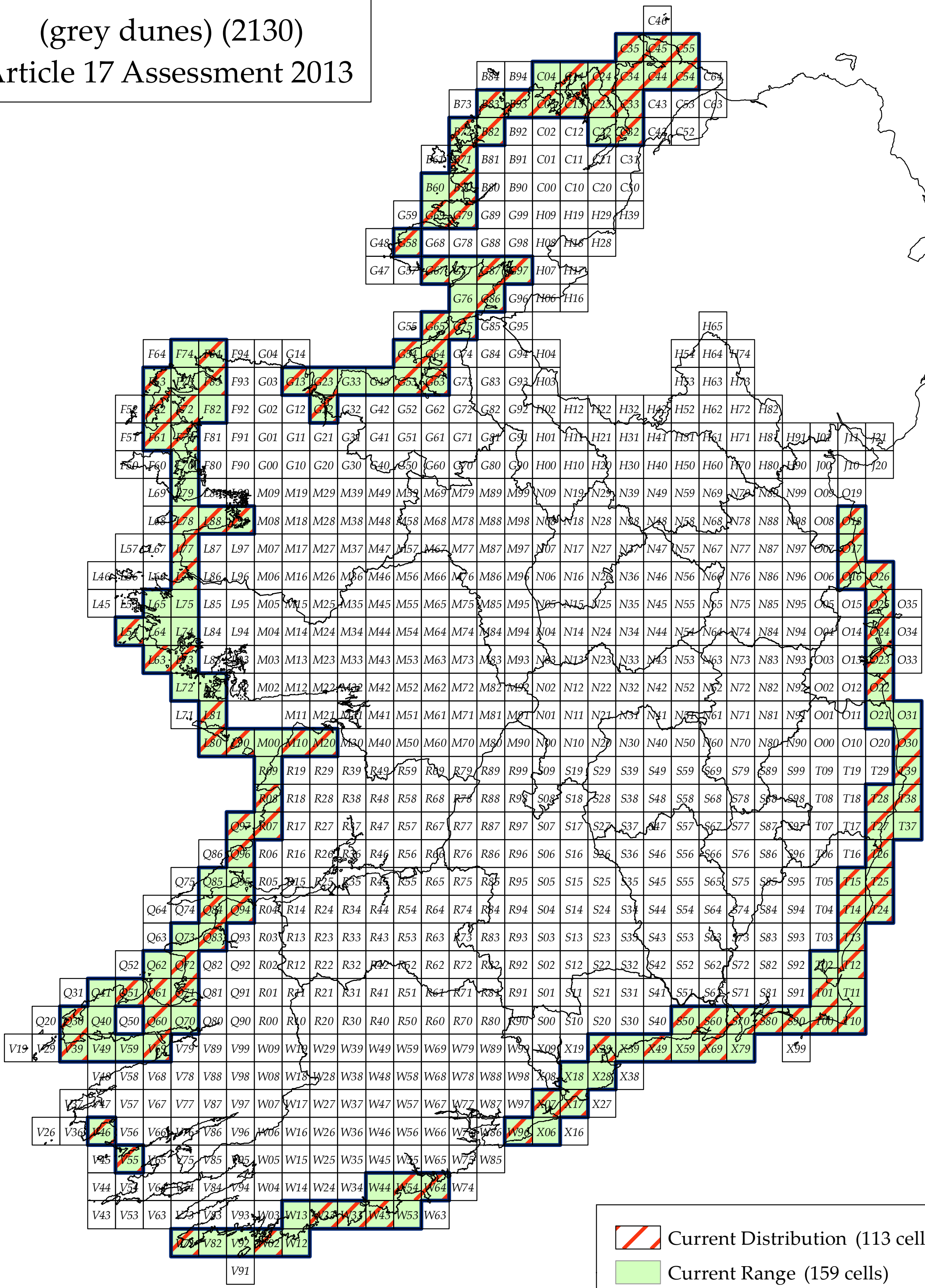
Field label	Note
Habitat code: 2130	
2.7.04 Structure and functions - Methods used	Fixed dunes were mapped and assessed at 36 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded fixed dune habitat from 152 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents almost 24% of the known sites, but over 46% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. During the SDM, eleven criteria were assessed in the structure and functions assessment including typical species, presence of negative indicator species, non-native species and the health of the vegetation. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established as follows: for sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 2130 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad. Best expert judgement was used to extrapolate the data collected during the SDM to determine the conservation assessment of the habitat at a national level.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is taken to be the favourable reference range as it does not appear to have decreased since designation and is adequate to retain the regional diversity of the habitat in Ireland.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Assessed as Favourable due to a net increase of 1.66% (121ha) to the national resource.

Field label	Note
Habitat code: 2130	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	74.9% of the habitat was assessed as by Delaney et al. (2013) as being in Favourable condition and 25.1% in poor condition, which corresponds to an assessment of Unfavourable-Bad. The criteria which failed most frequently assessed damage due to disturbance, height of vegetation, non-native species and lack of positive indicator species. Failure in these criteria is often linked to recreational pressures and inappropriate grazing regimes. While this may appear to be a borderline assessment, it was based on a survey of 36 out of a possible 152 sites. However, these 36 sites support over 46% of the total national resource and include most of our largest and best sites. Many of the other sites are small and unmanaged and it is likely that a high proportion of these (certainly more than 25%) would also fail on structure and functions. Consequently, based on best expert opinion an Unfavourable-Bad assessment is likely to be appropriate for the total national resource.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	2130 was assessed as Unfavourable-Bad in 2007 because 84% of the habitat was in Unfavourable condition and 22% of monitoring stops failed the assessment. Although there appears to have been an improvement, as Delaney et al. (2013) recorded a failure rate of 25.1%, it is unlikely that this represents any real improvement in the situation, particularly as a slightly different method of assessing the rate of failure was used in 2013. The two methods are not directly comparable. However, based on expert judgement the situation remains bad but stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), future prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". The top pressures on 2130 fixed dunes are presented in section 2.6, with the top five highlighted Of the 17 presented, 5 are of High importance (H) and 10 are of Medium importance (M). The presence of high and medium importance threats combined with the lack of mitigating measures on a national level, and few measures on a site level, suggests that the future trends for the area and structure and functions parameters are declining. Future prospects were assessed as Unfavourable-Bad.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future Prospects trend is stable because the main threats of inappropriategrazing regimes, recreation, buckthorn spread and other disturbances are likely to continue in the absence of mitigating measures.

Field label	Note
Habitat code: 2130	
2.8.05 Overall assessment of Conservation Status	Range was assessed as Favourable (stable) because there is no evidence of a reduction in range from the Favourable Reference range. Area was assessed as Favourable because despite a recorded loss of 3ha of habitat, there has been a net increase of 12ha (1.66%). Structure and functions were assessed as Unfavourable-Bad (stable). The criteria which failed most frequently assessed damage due to disturbance, height of vegetation, non-native species and lack of positive indicator species. Failure in these criteria is often linked to recreational pressures and inappropriate grazing regimes. Future prospects were assessed as Unfavourable-Bad (stable) because the impacts which have resulted in loss of area and impairment of structure and functions remain as threats. In particular, the absence of measures to address undergrazing and the resulting encroachment of scrub and Pteridium aquilinum could lead to a further reduction in the conservation value of the habitat in future. Because two of the parameters were assessed as Unfavourable-Bad, the overall conservation status of 2130 Fixed dunes with herbaceous vegetation was assessed as Unfavourable-Bad.
2.8.06 Overall trend in Conservation Status	The trend for the overall assessment was assessed as stable because although the situation has not improved significantly since the 2007 report, it has not deteriorated significantly either.
3.1.01 a) Surface area - Minimum	An intersection was carried out using the 2130 habitat polygons and NPWS SAC polygon. 30.10 km2 is included as a Qualifying Interest within an SAC, while 32.94 km2 is within and SAC but is not listed as a Qualifying Interest for the SAC.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value = max value.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring (SDM) project were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2130 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas. It1 is the most accurate figure that could be derived based on the available information.
3.1.03 Trend of surface area within the network	The total area of habitat within the SAC network has increased within the reporting period.

Field label	Note
Habitat code: 2130	
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Work has progressed to restore some coastal areas after exploitation for agriculture or tourism, and this has had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat.

Fixed dunes (grey dunes) (2130) Article 17 Assessment 2013



Current Distribution (113 cells)
Current Range (159 cells)
Favourable Reference Range (159 cells)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2140

NAME: Decalcified fixed dunes with Empetrum nigrum

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km^2)	300	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km^2)	300
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of actual decline since the Directive came into force. The range itself has changed, reflecting the change in the distribution as a result of the intensive surveying. However, the status of this habitat in Ireland requires further review.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Area covered by Habitat

2.4.1 Surface area (km^2)	0.01		
2.4.2 Year or period	2004-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	approximately equal to (≈)	
	unknown	No	
	method	0.05 km2 was given as the Favourable Reference Area (FRA) in 2007, however, a reassessment of the definition of this habitats suggests that a number of sites have been misidentified in the past. No anthropogenic loss has been recorded from the sites where the habitat has been confirmed, therefore the FRA is set as approximately equal to the current area. However, as the habitat is rarer than originally thought the FRA may be amended subject to further review as it is unclear whether the current area is sufficient for the long term viability of the habitat or whether grazing pressure has hindered the development of dune heath communities.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Storage of materials (E05)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Storage of materials (E05)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 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
Empetrum nigrum
Calluna vulgaris

Erica cinerea

Erica tetralix

2.7.2 Species method used	2.7.1 lists the selection of species that were deemed to provide the best indication of whether habitat was present. Monitoring surveys were carried out in 2011-2012 during the Sand Dunes Monitoring Project (SDM), however, they they did not assess the Structure & Functions of 2140 habitat. This asssessment is therefore based on the field visits conducted by NPWS staff during 2010 and 2011 to known 2140 sites.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	As Empetrum occurrence on fixed dunes now appears be confined to a very small number of locations in the northwest where calcareous sand has blown up over acidic rock, it is debatable whether this habitat should be listed in Ireland. However as that is a matter for further consideration, the results of the assessment are presented herein. Conditions may not have been optimal for the development of this habitat in the past. This is a successional habitat that can develop as dunes become decalcified and more acidic over time. Irish dunes may still be too calcareous in nature and there has been a long history of grazing on our sites, which would hinder the development of dune heath communities such as 2140. 2140 has been over-estimated in previous surveys and the 2007 assessment. During the Coastal Monitoring Project (Ryle et al. 2009), if Empetrum was recorded in the dune system then it was assumed to be the habitat 2140. However, this species is not confined to this habitat and may also be found in other dry heath communities and bog/mire habitats. In addition, mapping a habitat that is defined by the presence of a single species (Empetrum) presents certain problems. Estimating the surface area is complicated by the fact that this habitat is often found in a mosaic with other habitats, notably fixed dunes with herbaceous vegetation and dry heaths. There is potential to significantly change the mapped area of 2140 by either dividing clusters of plants into separate patches of habitat or including them in one large patch of habitat and increasing the area significantly. This issue is exacerbated by the fact that the national total for this habitat is so small, so even relatively small changes in the way the habitat is mapped can have significant impacts on the final total. Consequently the estimate of 1ha is an absolute minimum figure and should be treated with extreme caution.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.01	max	0.01
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 2140	
0.2 Habitat code	This habitat is typically 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 blown up over rock that is siliceous (silica-rich) in nature. It is characterised by the presence of crowberry (Empertrum nigrum), which is the only thing that differentiates it from the other dune heath habitat- decalcified fixed dunes (2150). Crowberry is found in conjunction with ling (Calluna vulgaris), cross-leaved heath (Erica tetralix), common gorse (Ulex europaeus), western gorse (Ulex gallii) and sand sedge (Carex arenaria).
1.1.02 Method used - map	Ryle et al. (2009), Crawford et al. (1996) and NPWS data was consulted to draw up a list of potential sites supporting dunes with Empetrum nigrum (2140). Each site was revisited by NPWS staff in 2010 and 2011 to confirm the presence/absence of the habitat. This data was used to determine the current distribution map. Records from the Sand Dune Monitoring Project (Delaney et al. 2013) was also used to supplement the dataset. This was then used as the basis for the range map created using the range tool.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map.
1.1.04 Additional distribution map	2140 polygons from various data sources (see section 1.1.2) were intersected with the ING 10 square grid to determine the national grid distribution. The distribution coincides with 3 10km2 grid squares. One of the grid squares included in the 2007 assessment was excluded and one grid square was added to the distribution. These changes were due to improved knowledge. This heath-like habitat does not appear to be well developed in Ireland and is thought to be restricted to a small number of sites along the north-west coast. Its presence hs only been confirmed from 3 sites since 2007. However, further research is needed to establish the exact distribution and extent of this extremely rare habitat.
1.1.05 Range map	The range tool did not generate any additional cells so the range range is considered to be the same as the current distribution (1.1.4).
2.2 Published sources	The Coastal Monitoring Project (CMP) represents the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle et al, 2009). A total of 181 sites were identified, mapped and each habitat present assessed. Four of the sites were reported to support Empetrum dunes (2140). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 sites between 2011 and 2012, including 3 of the sites that supported Empetrum dunes, as part of the Sand Dunes Monitoring Project (SDM). The habitat 2140 was only confirmed to be present at one of these sites during the SDM. In addition, the SDM further refined the methodology for monitoring dune habitats. Gaynor (2008) provided additional background information on the habitat, while the NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Fealy and Murphy (2009) and Farrell (2009) contributed to the impacts assessment.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.

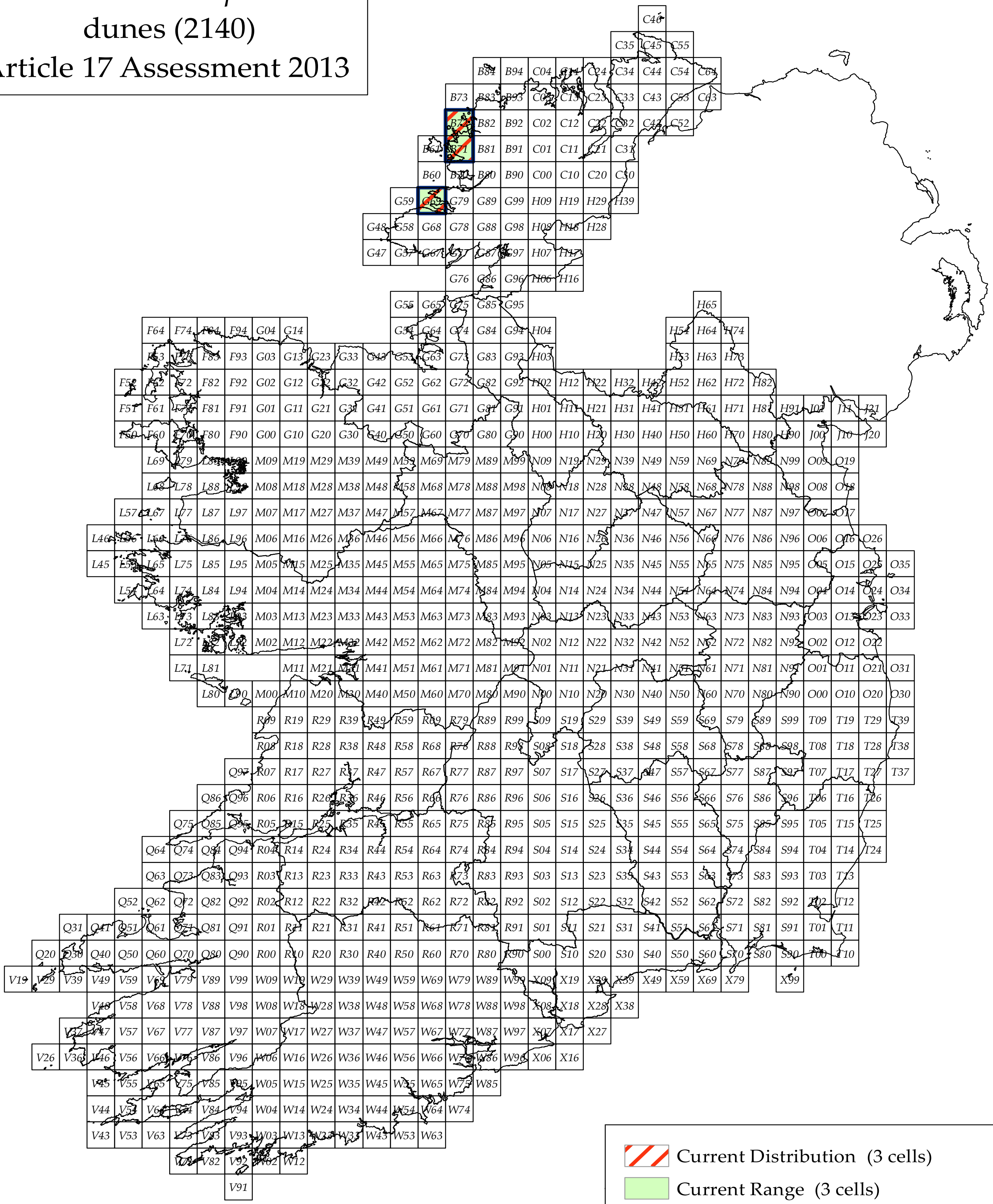
Field label	Note
Habitat code: 2140	
2.3.02 Method used - Range	Delaney et al. (2009) and information from in-house survey work carried out by NPWS staff in 2010 and 2011 were used as the basis for the distribution map. The range tool did not generate any additional cells. Therefore the range was taken to be the same as the distribution.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The change in range is due to a change in the methodology and improved knowledge.
2.4.01 Surface area	The Sand Dunes Monitoring Project (SDM) did not map any dunes with Empetrum nigrum at any of the 39 sites that were revisited in 2011-2012, as the patches did not meet the minimum area required for mapping purposes of 100m2. .This made it impossible to directly compare the SDM data to the data produced for the same sites during the CMP. However, it was apparent that the area of this habitat had been significantly over-estimated during the CMP and other earlier reviews. Part of this was due to the different methodologies used and the different criteria used to define the habitat. For the SDM a minimum mapping area was set, as well as a minimum percentage cover for the character species, Empetrum nigrum. During the CMP the occurrence of Empetrum on sand was adequate to identify the habitat. NPWS personnel returned to most of these sites during 2010-2011 and determined if the areas identified by the CMP as 2140 met the criteria for this particular habitat. One of the determining factors was that there needed to be a minimum depth of 5cm of sand and that sand sedge (Carex arenaria) needed to be present. The habitat was re-confirmed from 3 sites (Keadue, Cruit Island and Sheskinmore). This habitat appears to be even rarer than originally thought. In the absence of accurately mapped polygons for this habitat, best expert judgement was used to estimate a total national area of approximately 1ha. However, it should be noted that mapping a habitat that is defined by the presence of a single species (Empetrum) presents certain problems. Estimating the surface area is complicated by the fact that this habitat is often found in a mosaic with other habitats, notably fixed dunes with herbaceous vegetation and dry heaths. In addition, there was potential to significantly change the mapped area of 2140 by either dividing clusters of plants into separate patches of habitat or including them in one large patch of habitat and increasing the area significantly. This issue is exacerbated by the fact that the national total for this habitat is so small, so even relatively small changes in the way the habitat is mapped can have significant impacts on the final total. Consequently the estimate of 1ha is an absolute minimum figure and should be treated with caution. Further work is required to accurately determine the true nature and extent of this habitat in Ireland.
2.4.02 Year or period	Area is entirely based on the results of the findings of the Sand Dunes Monitoring Project (Delaney et al. 2013) and the field surveys conducted by NPWS staff between 2010 and 2011.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). No confirmed losses have been recorded in that time.

Field label	Note
Habitat code: 2140	
2.4.05 Short-term trend - Trend direction	The change in area since the assessment in 2007 is the result of a re-evaluation of the status and definition of this habitat, rather than actual losses. Therefore trend is assessed as stable.
2.4.07 Short-term trend - Method used	Based primarily on a comparison of the data from the Coastal Monitoring Project (CMP) (Ryle et al. 2009) with the results of the Sand Dunes Monitoring Project (SDM) (Delaney et al. 2013) and field surveys conducted by NPWS staff (2010-2011).
2.4.13 b) Reason for change - improved knowledge/more accurate data?	An apparent decrease of 2ha (.02 Km2) is considered to be related to the revised criteria used to define the habitat, which meant that a number of sites where the habitat was previously thought to be present no longer met the criteria.
2.5 Main pressures	The main pressures experienced by dunes with Empetrum nigrum continue to be linked to agricultural improvement, undergrazing (leading to scrub encroachment and the spread of bracken) and competition from other dune habitats. The top pressure (ranked H) is: A04.03 Abandonment of pastoral systems, lack of grazing This is followed by: A02.01 Agricutural intensification I01 Invasive non-native species I02 Problematic native species (referring to bracken spread) K02.01 Species composition change (succession)
2.5.01 Method used - pressures	Pressures noted during the field surveys conducted by NPWS staff between 2010 and 2011, Delaney et al. (2013) and SIR data on impacts noted in protected areas by NPWS rangers have been used in this assessment. Negative impacts (pressures) were subsequently ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 2140 habitat were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. The top pressures were determined through a combination of the ranking system and expert judgement.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures, the list is the same for threats, with the addition of climate change and coastal protection works. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain all dune habitats, including dunes with Empetrum nigrum. Coastal protection works can impact negatively by causing over-stabilisation of naturally dynamic dune systems.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.04 Structure and functions - Methods used	Best expert judgement based on the field surveys conducted by NPWS staff in 2010 and 2011 was used to assess the Structure & Functions of 2140. Based on the amount of bracken and scrub encroachment that was evident at the sites, the Structure & Functions are assessed as Unfavourable-Inadequate.

Field label	Note
Habitat code: 2140	
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range was taken to be the favourable reference range, as there is no indication that it has declined since the Directive came into force.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of 2140 has changed considerably since 2007, mainly because our criteria to define the habitat have changed and sites have been mapped in finer detail. Therefore it is not possible at this time to definitively state whether or not there has been a genuine change in the habitat area without conducting more in-depth research. However, as there is no evidence of anthropogenic loss since the Directive came into force, Area has been assessed as favourable
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Based on expert judgement approximately 90% of the habitat was assessed as being in Favourable status. This corresponds to an assessment of Unfavourable-Inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In the absence of any clear evidence of anthropogenic change the trend is assessed as stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". Future prospects were assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Although there are no documented reports of actual losses in this habitat, the number of sites As ongoing pressures are unlikely to increase in intensity the qualifier for Future Prospects has been set as stable.
2.8.05 Overall assessment of Conservation Status	There is no evidence to suggest that the change in range since 2007 reflects actual losses, rather than changes to the interpretation and criteria used to define the habitat. Therefore the range is assessed as Favourable. Area was assessed as Favourable as no actual loss has been recorded in this habitat since the Directive came into force. Structure and functions were assessed as Unfavourable-Inadequate as the habitat is so poorly developed in Ireland. As there was no change in the assessment between the two reporting periods the trend is set as stable. Future prospects were assessed as Unfavourable-Inadequate due to inappropriate grazing regimes (particularly undergrazing) and agricultural intensification. These pressures are not likely to increase in intensity in the future, therefore the qualifier has been set as stable. The overall conservation status of 2140 was assessed as Unfavourable-Inadequate due to the ongoing pressures.
2.8.06 Overall trend in Conservation Status	Although the overall qualifier has been set as stable it should be noted that this habitat is particularly vulnerable as it only covers a small area and has a disjunct, restricted distribution.

Field label	Note
Habitat code: 2140	
3.1.01 a) Surface area - Minimum	All of the known and confirmed areas of 2140 are located within the Natura 2000 network as qualifying Interests of one of two SACs. The total area of 2140 which is located within the Natura 2000 network is 0.01 km2. However, this figure should be treated withcaution (see 2.4.1)
3.1.02 Method used	The figure for the current estimated national area of 2140 was used, as all known areas of this habitat are located within the Natura 2000 network.
3.1.03 Trend of surface area within the network	There have been no reported losses due to anthropogenic factors, so the trend is set as stable.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the NATURA 2000 network where management of the habitat is governed by strict regulations. Further information regardfing habitat regulations can be obtained from the NPWS website http://www.npws.ie/legislationandconventions/irishlaw/euregulations/).

Decalcified *Empetrum* dunes (2140)
Article 17 Assessment 2013



Current Distribution (3 cells)
Current Range (3 cells)
Favourable Reference Range (3 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
19-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2150

NAME: Atlantic decalcified fixed dunes (Calluno-Ulicetea)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published:

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km^2)	500	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km^2)	500
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of actual decline since the Directive came into force. The range itself has changed, reflecting the change in the distribution as a result of the intensive surveying. However, the status of this habitat in Ireland requires further review.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Area covered by Habitat

2.4.1 Surface area (km^2)	0.5		
2.4.2 Year or period	2004-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	approximately equal to (≈)	
	unknown	No	
	method	1 km2 was given as the Favourable Reference Area (FRA) in 2007, however, a reassessment of the definition of this habitats suggests that a number of sites have been misidentified in the past. No anthropogenic loss has been recorded from the sites where the habitat has been confirmed, therefore the FRA is set as approximately equal to the current area. However, as the habitat is rarer than originally thought the FRA may be amended subject to further review as it is unclear whether the current area is sufficient for the long term viability of the habitat or whether grazing pressure has hindered the development of dune heath.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Storage of materials (E05)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Storage of materials (E05)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 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
Calluna vulgaris
Erica cinerea
Erica tetralix
Ulex galii

2.7.2 Species method used	2.7.1 lists the selection of species that were deemed to provide the best indication of whether habitat was present. Monitoring surveys were carried out in 2011-2012 during the Sand Dunes Monitoring Project (SDM), however, they they did not assess the Structure & Functions of 2150 habitat. This asssessment is therefore based on field visits conducted by NPWS staff during 2010 and 2011 to known 2150 sites.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	It is now apparent thatdune heath is a very rare habitat type in Ireland. This habitat appears to be confined to a small number of locations in the northwest where calcareous sand has blown up over acidic rock and one outlier on the east coast (Brittas Bay). Conditions may not have been optimal for the development of this habitat in the past. This is a successional habitat that can develop as dunes become decalcified and more acidic over time. Irish dunes may still be too calcareous in nature and there has been a long history of grazing on our sites, which would hinder the development of dune heath communities such as 2150. 2150 has been over-estimated in previous surveys and the 2007 assessment. During the Coastal Monitoring Project (Ryle et al. 2009), if Calluna or any Erica species was recorded in the dune system then it was assumed to be the habitat 2150. However, these species are not confined to this habitat and may also be found in other dry heath communities. Estimating the surface area is complicated by the fact that this habitat is often found in a mosaic with other habitats, notably fixed dunes with herbaceous vegetation and dry heaths. There is potential to significantly change the mapped area of 2150 by either dividing clusters of plants of heath species into separate patches of habitat or including them in one large patch of habitat and increasing the area significantly. This issue is exacerbated by the fact that the national total for this habitat is so small, so even relatively small changes in the way the habitat is mapped can have significant impacts on the final total. Consequently the estimate of 50ha is an absolute minimum figure and should be treated with extreme caution. Further work is required to accurately determine the true nature and extent of this habitat in Ireland.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.5	max	0.5
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 2150	
0.2 Habitat code	As with the habitat Decalcified dunes with Empetrum nigrum (2140), this habitat is typically 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 blwon up over rock that is siliceous (silica-rich) in nature. Species present are almost identical between these two habitats, but in the case of 2150 crowberry (Empetrum nigrum) is absent. Typical species include ling (Calluna vulgaris), bell heather (Erica cinerea), cross-leaved heather (Erica tetralix), common gorse (Ulex europaeus), western gorse (Ulex gallii), and sand sedge (Carex arenaria). Lichens, particularly Cladonia species, can be locally abundant along with a range of herbaceous species more typically associated with fixed dunes.
1.1.02 Method used - map	Ryle et al. (2009), Crawford et al. (1996) and NPWS data was consulted to draw up a list of potential sites supporting decalcified fixed dunes (2150). Each site was revisited by NPWS staff in 2010 and 2011 to confirm the presence/absence of the habitat. This data was used to determine the current distribution map. Records from the Sand Dune Monitoring Project (Delaney et al. 2013) was also used to supplement the dataset. This was then used as the basis for the range map created using the range tool.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map
1.1.04 Additional distribution map	2150 polygons from various data sources (see section 1.1.2) were intersected with the ING 10 square grid to determine the national grid distribution. The distribution coincides with 5 10km2 grid squares. Three of the grid squares included in the 2007 assessment were excluded from the distribution. These changes were due to improved knowledge. This heath-like habitat does not appear to be well developed in Ireland and is thought to be restricted to a small number of sites along the north-west coast and a single site at Brittas Bay on the east coast. This habitat may well develop at a number of sites in the future as they age and become progressively decalcified. There are signs that this may be happening at Ballytiege Burrow where soil analyses along transect from the sea show a progressive increase in soil acidity with age. However, further research is needed to establish the exact extent and distribution of this extremely rare habitat.
1.1.05 Range map	The range tool did not generate any additional cells so the range is considered to be the same as the current distribution (see 1.1.4).

Field label	Note
Habitat code: 2150	
2.2 Published sources	The Coastal Monitoring Project (CMP) represents the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle et al, 2009). A total of 181 sites were identified, mapped and each habitat present assessed. Seven of the sites were reported to support decalcified fixed dunes (2150). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 sites between 2011 and 2012, including 5 of the sites that supported decalcified fixed dunes, as part of the Sand Dunes Monitoring Project (SDM). The habitat 2150 was only confirmed to be present at four of these sites during the SDM. In addition, the SDM further refined the methodology for monitoring dune habitats. Gaynor (2008) provided additional background information on the habitat, while the NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Fealy and Murphy (2009) and Farrell (2009) contributed to the impacts assessment.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	Delaney et al. (2009) and information from in-house survey work carried out by NPWS staff in 2010 and 2011 were used as the basis for the distribution map. The range tool did not generate any additional cells. Therefore the range was taken to be the same as the distribution.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: “The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this”.
2.3.04 Short term trend - Trend direction	The increase in range is due to a change in the methodology and improved knowledge. Most of the difference in range is due to the use of the range tool.

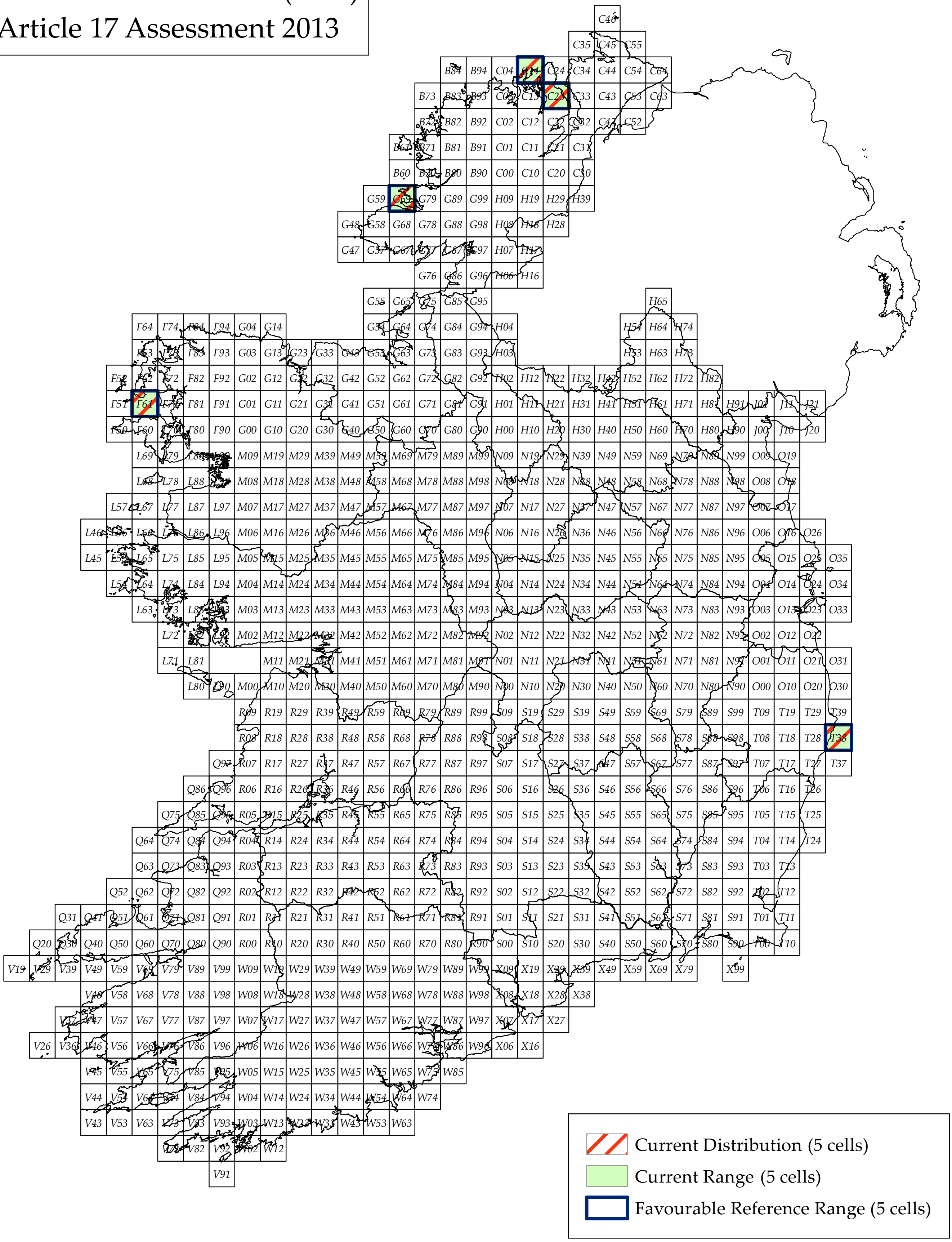
Field label	Note
Habitat code: 2150	
2.4.01 Surface area	The Sand Dunes Monitoring Project (SDM) mapped some but not all of the areas of dune heath found at any of the 39 sites that were revisited in 2011-2012. Some of the patches did not meet the minimum area required for mapping purposes of 100m2. However, the area was estimated to cover 32ha.This made it difficult to directly compare the SDM data to the data produced for the same sites during the CMP. However, it was apparent that the area of this habitat had been significantly over-estimated during the CMP and other earlier reviews. Part of this was due to the different methodologies used and the different criteria used to define the habitat. For the SDM a minimum mapping area was set, as well as a minimum percentage cover for the cover of heath species (Calluna and Erica spp.). During the CMP the occurrence of any of these species on sand was adequate to identify the habitat as 2150. NPWS personnel returned to most of these sites during 2010-2011 and determined if the areas identified by the CMP as 2150 met the criteria for this particular habitat. One of the determining factors was that there needed to be a minimum depth of 5cm of sand and that sand sedge (Carex arenaria) needed to be present. The habitat was re-confirmed from 5 sites (Brittas Bay, Aghleam, Maghera, Lough Nagreany and Sheskinmore) and additional small areas found at 2 sites (Kincaslough and Crummies Bay). It was not considered to be present at Termoncarragh Lough or Cruit Lower. This habitat appears to be even rarer than originally thought. Those polygons that were mapped for this habitat were used as the basis for the area estimate from 5 of the 7 sites. Expert judgement was used to estimate the areas that fell outside the minimum area mapping requirement and for the sites that were not covered by the SDM to give a total national area of approximately 50ha. It should be noted that mapping this habitat presents certain problems. Estimating the surface area is complicated by the fact that this habitat is often found in a mosaic with other habitats, notably fixed dunes with herbaceous vegetation and dry heaths. In addition, there was potential to significantly change the mapped area of 2150 by either dividing clusters of plants into separate patches of habitat or including them in one large patch of habitat and increasing the area significantly. This issue is exacerbated by the fact that the national total for this habitat is so small, so even relatively small changes in the way the habitat is mapped can have significant impacts on the final total. Consequently the estimate of 50ha is an absolute minimum figure and should be treated with caution. Further work is required to accurately determine the true nature and extent of this habitat in Ireland.
2.4.02 Year or period	Area is based entirely on the findings of the Sand Dunes Monitoring Project (Delaney et al. 2013) and the field surveys conducted by NPWS staff between 2010 and 2011.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). No confirmed loss has been recorded in that time.
2.4.05 Short-term trend - Trend direction	The change in area since the assessment in 2007 is the result of a re-evaluation of the status and definition of this habitat, rather than actual losses. Therefore trend is assessed as stable.

Field label	Note
Habitat code: 2150	
2.4.07 Short-term trend - Method used	The trend is based primarily on a comparison of the data from the Coastal Monitoring Project (Ryle et al. 2009) with the results of the Sand Dunes Monitoring Project (Delaney et al. 2013) and field surveys conducted by NPWS staff (2010-2011).
2.4.13 b) Reason for change - improved knowledge/more accurate data?	An apparent decrease of 28ha (0.3km2) is considered to be related to the revised criteria used to define the habitat, which meant that a number of sites where the habitat was previously thought to be present no longer met the criteia.
2.5 Main pressures	The main pressures experienced by decalcified fixed dunes (2150) continue to be associated with undergrazing (leading to scrub encroachment and the spread of bracken), agricultural improvement and succession. The top pressure is : A04.03 Abandonment of pastoral systems, lack of grazing This is followed by: A02.01 Agricultural intensification I01 Invasive non-native species I02 Problematic native species (referring to bracken) K02.01 Species composition change (succession)
2.5.01 Method used - pressures	Pressures noted during the field surveys conducted by NPWS staff between 2010 and 2011, Delaney et al. (2013) and SIR data on impacts noted in protected areas by NPWS rangers have been used in this assessment. Negative impacts (pressures) were subsequently ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 2150 habitat were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. The top pressures were determined through a combination of the ranking system and expert judgement.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats, with the addition of climate change and coastal protection works. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain all dune habitats. The presence of coastal protection works can impact negatively by causing over-stabilisation of naturally dynamic dune systems.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.04 Structure and functions - Methods used	Best expert judgement based on the field surveys conducted by NPWS staff in 2010 and 2011 was used to assess Structure & Functions of 2150. Based on the amount of bracken and scrub encroachment that was evident at the sites, the Structure & Functions was assessed as Unfavourable-Inadequate.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range was taken to be the favourable reference range, as there is no indication that it has declined since the Directive came into force.

Field label	Note
Habitat code: 2150	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of 2150 has changed considerably since 2007, mainly because our criteria to define the habitat have changed and sites have been mapped in finer detail. Therefore it is not possible at this time to accurately state whether or not there has been a genuine change in the habitat area without conducting more in-depth research. However, as there is no evidence of anthropogenic loss Area has been assessed as favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Based on expert judgement approximately 85% of the habitat was assessed as being in Favourable status. This corresponds to an assessment of Unfavourable-Inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In the absence of any clear evidence of anthropogenic change the trend is assessed as stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". Future prospects were assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As ongoing pressures are unlikely to increase in intensity the qualifier for Future Prospects has been set as stable.
2.8.05 Overall assessment of Conservation Status	There is no evidence to suggest that the change in range since 2007 reflects actual losses, rather than changes to the interpretation and criteria used to define the habitat. Therefore the range is assessed as Favourable. Area was assessed as Favourable as no actual loss has been recorded in this habitat since the Directive came into force. Structure and functions were assessed as Unfavourable-Inadequate as the habitat is so poorly developed in Ireland. As there was no change in the assessment between the two reporting periods the trend is set as stable. Future prospects were assessed as Unfavourable-Inadequate due to inappropriate grazing regimes (particularly undergrazing) and agricultural intensification. These pressures are not likely to increase in intensity in the future, therefore the qualifier has been set as stable. The overall conservation status of 2150 was assessed as Unfavourable-Inadequate due to the ongoing pressures.
2.8.06 Overall trend in Conservation Status	Although the overall qualifier has been set as stable it should be noted that this habitat is particularly vulnerable as it only covers a small area and has a disjunct, restricted distribution.

Field label	Note
Habitat code: 2150	
3.1.01 a) Surface area - Minimum	Almost all of the known and confirmed areas of 2150 are located within the Natura 2000 network, although small areas are known to occur adjacent to (but outside) the SAC boundary at one site. The area inside the network is approximately 48ha (0.48 km2), all of which is a qualifying interest for the relevant SAC. However, this figure should be treated with caution.
3.1.03 Trend of surface area within the network	There have been no reported losses due to anthropogenic factors, so the trend is stable.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the NATURA 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website http://www.npws.ie/legislationandconventions/irishlaw/euregulations/).

Decalcified dune heath (2150)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
19-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2170

NAME: Dunes with Salix repens ssp. argentea (Salicion arenariae)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Wilson, F. and Foss, P.J. (2011). The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council.

Geographical information supplied by NPWS including data from Fingal, Dun Laoghaire-Rathdown and Mayo County Councils

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	2900	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	2900
	operator	N/A
	unknown	No
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Directive came into force.
2.3.10 Reason for change	Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.5		
2.4.2 Year or period	2004-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	increase (+)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	1.5	
	operator	N/A	
	unknown	No	
	method	The Sand Dunes Monitoring project (SDM) mapped dunes with S. repens habitat from 14 of the 39 sites that were revisited in 2011-2012 (Delaney et al. 2013). The SDM data was compared to the data produced for the same sites during the Coastal Monitoring Project (CMP) (Ryle et al. 2009). It was determined that the area of this habitat had been under-estimated during the CMP. Therefore the Favourable Reference Area has been readjusted to the current area as there has only been negligible losses of habitat since the Directive came into force. However it is very likely that additional areas may have been overlooked during the CMP and this figure may be further revised in light of additional survey work.	
2.4.13 Reason for change	Genuine Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	Acid input/ acidification (A)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
Erosion (K01.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	Acid input/ acidification (A)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)

Trampling, overuse (G05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
Erosion (K01.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 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

2.7.2 Species method used	Species listed in 2.7.1 represent the selection of species that were deemed to provide the best indication of whether the habitat 2170 was present. The species were selected following a literature review ,taking into account the species listed in the Interpretation manual of European habitats, the JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés collected in 2011 as part of the Sand Dune Monitoring Project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Loss of area due to human activities was considered to represent a deterioration in the area assessment. Increases in area due to habitat restoration were considered to represent an improvement in the area assessment.
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	In total, ten criteria were assessed in the structure and functions assessment of 2170, including typical species, presence of negative indicator species, native and non-native invasive species, sward height, bare ground and proportion of the vegetation able to flower or fruit. Other criteria assessed included tree and scrub cover, and bare ground cover. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. See Delaney et al. (2013) for a full list of structure and functions criteria assessed.

Sand dunes are dynamic systems and in some cases, the habitat may not fulfil all of the structure and functions criteria or the area might decrease for natural reasons which are not related to anthropogenic activities. The methodology sought to allow for natural habitat variation, but in some cases expert judgement was used in the assessment.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1.11	max	1.11
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent	low importance (L)	Both	Enhance
No measure known/ impossible to carry out specific measures (1.3)		low importance (L)	Both	Not evaluated
Restoring coastal areas (4.4)	Recurrent One-off	low importance (L)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal	low importance (L)	Outside	Enhance

Field label	Note
Habitat code: 2170	
0.2 Habitat code	This habitat is typically found either within dune slacks on sandy hummocks, or on the sides of dune ridges adjacent to slacks. In order to be classified as 2170 Dunes with Salix repens ssp. argentea (Salicion arenariae), the area in question should be beyond the influence of the water table, either through elevation of the surface of the ground or by a lowering of the water table. It is characterised by a dominance of Salix repens, which often forms a dense ground cover. Moisture-loving plant species typically associated with dune slacks should be absent or noticeably reduced. Species associated with this habitat include Holcus lanatus, Carex flacca and Carex arenaria, Agrostis stolonifera, Pilosella officinarum, Euphrasia officinalis agg., Ononis repens and Lotus corniculatus.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the 2170 distribution map. Supplementary information was gathered from sources listed in 2.2 and the final distribution was edited after consultation with the NPWS sand dunes expert, Dr. Karen Gaynor.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map
1.1.04 Additional distribution map	2170 polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. The distribution coincides with 19 10km2 grid squares. Three of the grid squares included in the 2007 assessment were excluded and one grid square was added to the distribution. These changes were due to improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. Two cells generated by the range tool were removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 17 of these sites supported dunes with S. repens habitat (2170). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 14 of the sites that supported fixed dune habitat (2170), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2008) provided additional background information on the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.

Field label	Note
Habitat code: 2170	
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the distribution map for the habitat 2170 Dunes with S. repens. Supplementary information was gathered from sources listed in 2.2 and the final distribution was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Two cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The increase in range is due to a change in the methodology and improved knowledge. Most of the difference in range is due to the use of the range tool.
2.3.09 a) Favourable reference range - In km2	There is no indication that there has been anthropogenic loss of range since implementation of the Habitats Directive. The data used in 2013 is the most up-to-date information available and the range tool is the accepted method for generating range. The figure derived from the 2013 data should be used as the FRR.
2.3.10 a) Reason for change - genuine change?	See 2.3.4.
2.4.01 Surface area	The Sand Dunes Monitoring (SDM) project mapped 2170 habitat from 14 of the 39 sites that were revisited in 2011-2012. The total area mapped was 108.7ha. The SDM data was compared to the data produced for the same sites for the CMP. It was determined that the area of this habitat had been under-estimated during the CMP by approximately 1.66%. Based on the assumption that this underestimation is representative of the entire survey, the original national area submitted in 2007 is increased by 1.66% to give a revised national area for 2007 of 120ha (1.2km2). The Coastal Monitoring Project (CMP) recorded dune slack habitat from 64 sites (Ryle et al 2009), giving an estimated total area of 103.59ha. The subset of sites assessed by the SDM represents almost 45% of the known sites, but this covered approximately 75% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. The current national area of 2170 was estimated by extrapolation from data in the SDM (Delaney et al. 2013). The area surveyed (108.7ha) represented 75% of the CMP habitat. Multiplying this figure would give a total figure of 150ha. These figures should be treated with some caution as they are estimates based on extrapolation. However, based on the best possible information available it appears that the area of 2170 dunes with S. repens habitat is approximately 150ha (1.5km2). The polygons mapped by Delaney et al. (2013) are as true as possible a representation of the size and shape of the habitat on the ground.
2.4.02 Year or period	Field surveys were carried out at 181 sites between 2004 and 2006 as part of the Coastal Monitoring Project and follow up surveys were carried out at a sample of 39 sites between 2011 and 2012 as part of the Sand Dunes Monitoring project.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). No loss has been recorded in that time, indicating that no loss has occurred since 2001.

Field label	Note
Habitat code: 2170	
2.4.05 Short-term trend - Trend direction	The change in area since the assessment in 2007 is the result of natural dynamism of coastal habitats. Natural increases and losses which are not related to human activities are not considered to represent deterioration or improvement in the conservation status. Although there has been an increase in the habitat area, the trend is stable.
2.4.07 Short-term trend - Method used	Based on field surveys in 2004 - 2006 for the Coastal Monitoring Project and surveys of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012.
2.4.13 a) Reason for change - genuine change?	Increase of 0.08 km2 is considered to be the result of genuine change. In some cases, the rate of succession from 2190 to 2170 may have been accelerated by human activities in the present (e.g. water abstraction) or in the past (e.g. old conifer plantations).
2.4.13 b) Reason for change - improved knowledge/more accurate data?	An increase of 0.12 km2 is considered to be related to the under recording of the habitat in 2007.
2.5 Main pressures	The main pressures on dunes with Salix repens continue to be linked to agriculture, recreation and interference with natural dynamics. Many sites have been modified in the past for developments such as sports pitches, golf courses, caravan parks, coniferous plantations, housing, roadways and airstrips. Perhaps the greatest impacts relate to inappropriate grazing regimes. Intensive grazing or overgrazing can lead to a reduction in species diversity, nutrient enrichment of the soil and destruction of the vegetation cover. Undergrazing or lack of grazing associated with land abandonment can be equally negative as it leads to development of species-poor grassland and eventually to scrub encroachment. Recreation remains a pressure on most sites in some form and G01 which relates to outdoor sports and leisure activities including walking, horseriding, off-road vehicles etc. could just as easily have been given a high rating as G02, which includes golf courses, sports pitches and caravan parks, although the intensity of the impacts tend to be higher than for G01. The introduction on non-native species, particularly buckthorn (Hippophae rhamnoides) remains a problem on many sites, particularly along the east coast. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including fixed dunes.
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al., 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 2170 habitat were estimated by the surveyors on a site-by-site level. Negative impacts (pressures) were subsequently ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. SIR data on impacts noted in protected areas by NPWS rangers were also consulted.

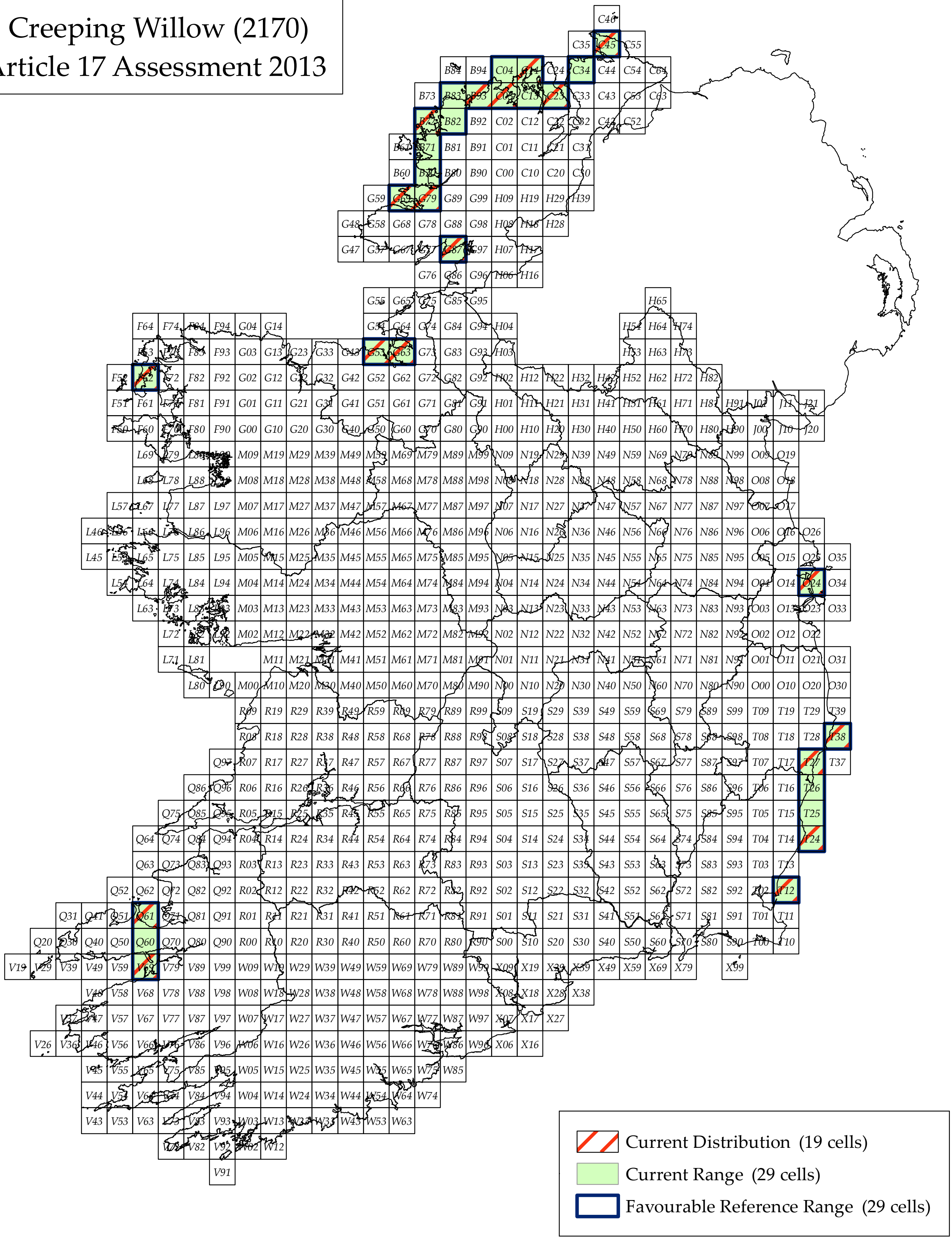
Field label	Note
Habitat code: 2170	
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats, with the addition of climate change and coastal protection works. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy and Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats. The presence of coastal protection works will impact on dune habitats in a similar fashion by reducing the opportunity for new dune habitat formation.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 to assess Structure and Functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least two of the species listed in over 40% of the monitoring stops and a further two species being present in over 20% of the stops. At least two positive indicator species had to be present within each stop for the habitat to pass the typical species criterion at a site. Salix repens was required to occupy at least 30% of the habitat for it to qualify as 2170.
2.7.04 Structure and functions - Methods used	Dunes with S. repens were mapped and assessed at 14 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded dunes with S. repens habitat from 17 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents 82% of the known sites, but over 82% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. In total, ten criteria were assessed in the structure and functions assessment,including typical species, presence of negative indicator species, indicators of rank conditions, non-native species, tree and scrub cover, bare ground cover, and the height of Salix repens. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 2170 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.

Field label	Note
Habitat code: 2170	
2.7.05 Other relevant information	78.08% of the habitat was assessed as being in Favourable status. This corresponds to an assessment of Unfavourable-Inadequate. The criteria which failed most frequently assessed the height of Salix repens and the presence of negative indicator species. The criteria assessing the cover of bare ground and the presence of trees and scrub also failed at two sites each.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range was taken to be the favourable reference range is there is no indication that it has declined since designation and it is adequate to conserve the diversity of the habitat within Ireland.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of 2170 appears to have increased since 2007 and there was no evidence of loss.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	78.08% of the habitat was assessed as being in Favourable status. This corresponds to an assessment of Unfavourable-Inadequate. The criteria which failed most frequently assessed the height of Salix repens and the presence of negative indicator species. The criteria assessing the cover of bare ground and the presence of trees and scrub also failed at two sites each.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Structure and functions were assessed as Unfavourable-Inadequate during in 2007 and there has been no change in the conservation status since then.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". 2170 has a total of 11 threats recorded by Delaney et al. (2013). 1 was of High importance (H) and 3 were of Medium importance (M). Undergrazing and its associated pressures, forestry and agricultural intensification are the main threats for this habitat. Undergrazing was ranked as a "High importance" threat and has wide implications for the habitat in terms of scrub and bracken encroachment and the spread of non-native species, as well as the development of tall, species-poor vegetation. The threats of forestry and agricultural intensification should lessen in the foreseeable future as a lot of activities based under these umbrella terms are notifiable actions. Currently, there no measures on a national level and few to no measures on a site level in place to prevent problems associated with undergrazing. This suggests that the future trends for the range, area and structure and functions parameters are declining. As none of the parameters have borderline assessments however, none are predicted to decline to the extent that there will be a change in their future status. Future prospects were therefore assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future prospects were assessed as Unfavourable-Inadequate in the last reporting period and as there is no change in this assessment in this reporting period, the qualifier is stable.

Field label	Note
Habitat code: 2170	
2.8.05 Overall assessment of Conservation Status	There is no evidence to suggest that there has been a deterioration in range since 2007, and range was assessed as Favourable. Area was assessed as Favourable as no loss has been recorded in this habitat since implementation of the Habitats Directive. Structure and functions were assessed as Unfavourable-Inadequate with 78.08% of the habitat in Favourable condition. The criteria which failed most frequently assessed the height of Salix repens and the presence of negative indicator species. The criteria assessing the cover of bare ground and the presence of trees and scrub also failed at two sites each. There was no change in the assessment and the trend was stable. Future prospects were assessed as Unfavourable-Inadequate (stable). Undergrazing and its associated pressures, forestry and agricultural intensification are the main threats for this habitat. Future Prospects were assessed as Unfavourable-Inadequate in 2007. The status of the habitat is not expected to decline further in the short term. Range and area were assessed as Favourable while structure and functions were assessed as Unfavourable-Inadequate. The conservation status of 2170 was assessed as Unfavourable-Inadequate.
2.8.06 Overall trend in Conservation Status	The assessment has not changed since the last reporting period and the conservation status of 2170 is assessed as stable.
3.1.01 a) Surface area - Minimum	The total area of 2170 which is located within the Natura 2000 network is 1.11 km2. Of this, 0.31 km2 occurs at sites where 2170 is listed as a QI and 0.79 km2 occurs within an SAC but is not listed as a QI.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring (SDM) project were combined with the habitat maps for all of the other sites surveyed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2170 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas. The area mapped during the CMP was found to have been underestimated by 12.2% when 39 of the sites were resurveyed during the SDM in 2011-2012. The underestimation was not consistent across all of the sites assessed during the SDM, so assuming that sites which were not visited during the SDM were overestimated by 12.2% is not a reliable way to estimate their surface area. Further, it is possible that habitats within SACs were surveyed in more than areas outside of SACs. The figure of 1.11 km2 presented in 3.1 is the most accurate figure that could be derived, but it may represent an underestimation of the true figure.
3.1.03 Trend of surface area within the network	Trend is stable as there has any changes in the area within the Natura 2000 network are the result of natural habitat fluctuations rather than restoration.

Field label	Note
Habitat code: 2170	
3.2 Conservation measures	Anthropogenic impacts on the site would indicate that further measures are required that are currently not being implemented. In particular, measures to tackle undergrazing would be beneficial. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. Some conservation measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Efforts have been made to restore some coastal areas after exploitation for agriculture or tourism, and these have had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion which threatens dune formation.

Dunes with Creeping Willow (2170) Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
05-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 2190

NAME: Humid dune slacks

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Anon. (2010). Meath Wetlands and Coastal Habitats Survey. Report prepared for Meath County Council and The Heritage Council.

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Crushell, P. and Foss, P. (2008). The County Clare Wetlands Survey 2008 - Desk Survey and GIS Preparation. Report prepared for Clare County Council, Clare Biodiversity Forum and The Heritage Council.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Devaney, F. (2007). The Alder Marsh: Ecohydrology and restoration prospects of a desiccating dune slack. Ph.D. Thesis. University College Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater-Dependent Terrestrial Ecosystems under the Water Framework Directive. A report prepared for the Environmental Protection Agency. Report Series No. 12.

NPWS (2013) Management Planning Support Unit Maps 2405_imap95

(CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Wilson, F. and Foss, P.J. (2011) The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council.

County Council Geographic Information supplied from NPWS from Fingal, County Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	7700
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)
2.3.3 Short-term trend period	2001-2012
2.3.4 Short-term trend direction	decrease (-)
2.3.5 Short-term trend magnitude	min 1.28 max
2.3.6 Long-term trend period	
2.3.7 Long-term trend direction	N/A
2.3.8 Long-term trend magnitude	min max
2.3.9 Favourable reference range	area (km²) 7800 operator N/A unknown No method In the last reporting period, the favourable reference range was set as the range calculated in 2007: 7900 km2. Improved knowledge, genuine change and the use of a different methodology for calculating range in 2013 have resulted in a revised favourable reference range. The revised favourable reference range is set as 7800 km2. This is the current range plus the single grid square where the habitat has been lost because of anthropogenic activities.
2.3.10 Reason for change	Genuine Use of different method

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	2.83
2.4.2 Year or period	2004-2012
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.4 Short-term trend period	2001-2012
2.4.5 Short-term trend direction	increase (+)
2.4.6 Short-term trend magnitude	min 1.86 max confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.8 Long-term trend period	
2.4.9 Long-term trend direction	N/A
2.4.10 Long-term trend magnitude	min max confidence interval
2.4.11 Long term trend method used	N/A
2.4.12 Favourable reference area	area (km) 2.9 operator N/A unknown No method The Sand Dunes Monitoring project (SDM) mapped dune slack habitat from 29 of the 39 sites that were revisited in 2011-2012

(Delaney et al. 2013). The SDM data was compared to the data produced for the same sites during the Coastal Monitoring Project (CMP) (Ryle et al. 2009). It was determined that the area of this habitat had been under-estimated during the CMP by approximately 32.17%. Based on the assumption that this under-estimation is representative of the entire CMP survey, the original national area submitted in 2007 of 211.5ha is increased by 32.17% to give a revised national area for 2007 of 280.59ha (2.81km2). Losses of 3.2% were recorded during the CMP which means that the FRA should have been set at 289.87ha (2.9km2). This is now used as the revised FRA. However it is very likely that additional areas may have been overlooked during the CMP and this figure may be further revised in light of additional survey work.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	Acid input/ acidification (A)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	Acid input/ acidification (A)
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	medium importance (M)	N/A
invasive non-native species (I01)	high importance (H)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
disposal of household / recreational facility waste (E03.01)	medium importance (M)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Agrostis stolonifera
Anagallis tenella
Bryum pseudotriquetrum
Calliergon cuspidatum
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 vulgaris
Aneura pinguis
Petalophyllum ralfsii

2.7.2 Species method used	Species listed in 2.7.1 represent the selection of species that were deemed to provide the best indication of whether habitat 2190 was present. The species were selected following a literature review, taking into account the species listed in the Interpretation manual of European Habitats (2003), the JNCC (2004) guidelines, the Coastal Monitoring Project (Ryle et al. 2009) and relevés collected in 2011 as part of the Sand Dunes Monitoring Project (Delaney et al. 2013). The list reflects various sub-communities and regional variations within this habitat.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Cover of bryophytes, negative indicator species, non-native species, scrub, and bare ground were also recorded. The proportion of broad-leaved plants to grasses, sedges and rushes was noted. Data relating to disturbance of the habitat was considered and the continued presence of rare plants was assessed where relevant. See Delaney et al. (2013) for full list of structure and functions criteria assessed.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.8.6 Overall trend in Conservation Status	declining (-)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	2.51	max	2.51

3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3. Trend of surface area	decrease (-)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Both	
No measure known/ impossible to carry out specific measures (1.3)		low importance (L)	Both	Not evaluated
Managing water abstraction (4.3)	Recurrent	high importance (H)	Both	Enhance
Restoring coastal areas (4.4)	Recurrent	medium importance (M)	Outside	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	low importance (L)	Outside	Enhance

Field label	Note
Habitat code: 2190	
0.2 Habitat code	Dune slacks are wet, nutrient-enriched depressions between dune ridges. They are characterised by the occurrence of a water table that is maintained by the combination of an impermeable layer in the soil, or by deeper salt water and precipitation. In winter in temperate regions, with relatively high rainfall and low evaporation, the water table normally rises above the soil surface and inundation occurs. In spring and during the major part of the summer, the water level drops, but the top layer of the soil remains wet (Boorman et al., 1997). Proximity of the local freshwater-table is evidenced in the vegetation, in which Juncus spp. (rushes), Carex spp. (sedges) and moisture-loving herbs such as Hydrocotyle vulgaris, Anagallis tenella, Parnassia palustris, Galium palustre and Epipactis palustris, are obvious features. Nutrient-enrichment results from leaching from the surrounding dune ridges. A wide spectrum of vegetation communities is observed in Irish dune slacks, reflecting the different formations and successional stages, as well as the frequency and duration of flooding. These include communities associated with pioneer slacks, wet slacks and mature dry slacks. Ranwell (1972) defines two distinct types of slack on the basis of hydrology: •Wet slacks (or low type), where the water-table is never more than 1m below the surface, moisture is always adequate, bryophytes are common and the flora is characterised by species with intermediate water requirements, with few grasses. •Dry slacks (or wet type), where the water-table can be 1-2m below the surface at all seasons, shallower-rooted species are uninfluenced by the water-table, but deep-rooted plants can benefit from it in drought. Plants with deep tap-roots and grasses are especially abundant and lichens may be locally abundant where there is rapid grazing. Two types of slacks are identified on the basis of their geomorphological history: (a) Primary slacks and (b) Secondary slacks. Primary slacks originate from sandy beaches, which have been partially or fully cut off from the influence of the sea by new foredunes, particularly in prograding systems. Embryo slacks are still affected to an extent by salinity and may be flooded by exceptionally high tides. Exceptionally, slacks may also form from saltmarshes, as sand dune encroaches on them. Secondary slacks result from blowouts or the landward movement of dune ridges in eroding systems. In the dynamic, successional setting of most dune systems the characteristic slack communities are maintained at least partly by disturbances, including fluctuations in the water-table, blown sand, the effects of nutrient limitation and grazing. The depth and duration of winter flooding and the severity of the summer drought are likely to be important determinants of slack community structure. Many dune slacks are dominated by Salix repens. The Habitats Directive recognises dunes with Salix repens as a separate habitat type ‘dunes with Salix arenaria’ (code: 2170). It should be noted that S. arenaria is a variant of S. repens that is restricted to dune slacks. The occurrence of S. repens is also noted in the Interpretation Manual as characteristic of a number of the sub-types in ‘humid dune slacks’. As a result, distinction between these two habitat types is difficult, although it appears that ‘dunes with Salix arenaria’ can only be applied to dune slacks that have experienced significant lowering of the water-table so that it is no longer a controlling influence on the vegetation. Owing to the fact that no groundwater level measurements were recorded during the current survey, interpretation of the groundwater influence is somewhat subjective and speculative.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the 2190 distribution map. Supplementary information was gathered from sources listed in 2.2.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map

Field label	Note
Habitat code: 2190	
1.1.04 Additional distribution map	2190 Humid dune slack polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. The final distribution of this habitat covers 52 grid squares. A comparison with the distribution map submitted in 2007 reveals that three grid squares were lost and two new grid squares were added to the distribution map due to improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool. Six cells generated by the range tool were removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 17 of these sites supported dunes with S. repens habitat (2170). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 14 of the sites that supported fixed dune habitat (2170), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2008) provided additional background information on the habitat and the geographical variation within the vegetation communities. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al. (1996) were used as the basis for the distribution map for 2190 humid dune slack. Supplementary information was gathered from sources listed in 2.2 and the final distribution was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Six cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2001) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The loss of two grid squares has led to a reduction in the range, so the trend is declining.
2.3.09 a) Favourable reference range - In km2	There has been a recorded decline in the range since the last reporting period. The reduction is less than 1% per year since 2007, so range is assessed as Unfavourable-Inadequate.
2.3.10 c) Reason for change - use of different method	Improved knowledge resulted in the addition of two grid squares and loss of two grid squares since 2007. One grid square was lost because of genuine, anthropogenic loss of habitat. However, most of the change in range is the result of the use of the range tool for estimating range.

Field label	Note
Habitat code: 2190	
2.4.01 Surface area	The Sand Dunes Monitoring (SDM) project mapped dune slack habitat from 29 of the 39 sites that were revisited in 2011-2012. The total area mapped was 205.32ha. The SDM data was compared to the data produced for the same sites for the CMP. It was determined that the area of this habitat had been significantly under-estimated during the CMP by approximately 32.2%. Based on the assumption that this underestimation is representative of the entire survey, the original national area submitted in 2007 is increased by 32.2% to give a revised national area for 2007 of 280.59ha (2.81km2). The Coastal Monitoring Project (CMP) recorded dune slack habitat from 64 sites (Ryle et al 2009), giving an estimated total area of 212.25ha. The subset of sites assessed by the SDM represents almost 45% of the known sites, but this covered approximately 75% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. The current national area of 2190 dune slacks was estimated by extrapolation from data in the SDM (Delaney et al 2013). The area surveyed (205.32ha) represented 75% of the CMP habitat. Multiplying this figure would give a total figure of 283ha. These figures should be treated with some caution as they are estimates based on extrapolation. It is also known that some fixed dune habitat, including areas within golf courses have been excluded from both sets of data. However, based on the best possible information available it appears that the area of 2190 dune slack habitat is approximately 283ha (2.83km2). The polygons mapped by Delaney et al. 2013 are as true as possible a representation of the size and shape of the habitat on the ground.
2.4.02 Year or period	Baseline field surveys were carried out at 181 sites (64 sites with 2190 dune slack habitat) between 2004 and 2006 as part of the Coastal Monitoring Project (Ryle et al . 2009). Monitoring surveys were carried out at a sample of 39 sites (29 with 2190 dune slack habitat) between 2011 and 2012 as part of the Sand Dunes Monitoring project (Delaney et al. 2013).
2.4.04 Short-term trend - Period	The trend reported in 2013 is based a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). Losses have been recorded in that time.
2.4.05 Short-term trend - Trend direction	Although there has been a small loss of habitat caused by anthropogenic factors, the total area has actually increased. Therefore the trend is increasing
2.4.06 a) Short-term trend - Magnitude - Minimum	There was an anthropogenic loss of 0.01 km2, or 0.67% within the sample area between the Coastal Monitoring Project and the Sand Dunes Monitoring project. This equates to a loss of less than 1% per year. The recorded anthropogenic loss is equal to 0.53% of the total area of 2190 which was present in Ireland during the Coastal Monitoring Project.
2.4.07 Short-term trend - Method used	Based primarily on field surveys of 64 sites in 2004 - 2006 for the Coastal Monitoring Project (Ryle et al. 2009) and surveys of 29 of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012 (Delaney et al. 2013).
2.4.13 a) Reason for change - genuine change?	There has been a net increase of 0.46 km2, although it should be noted that the majority of this increase is due to the habitat having been overlooked and underrecorded in earlier surveys and does not necessarily represent new habitat. Finding additional areas of dune slack is likely to improve the chances of maintaining all of the regional variation displayed within the habitat.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Although there have been some losses recorded, field surveys suggest that there has an overall increase of 0.46km2 in the area of 2190 since the 2007 report. However, it is likely that 0.05km2 can definitely be attributed to a real increase in the area of habitat. This represents a 1.86% increase in the national total area.

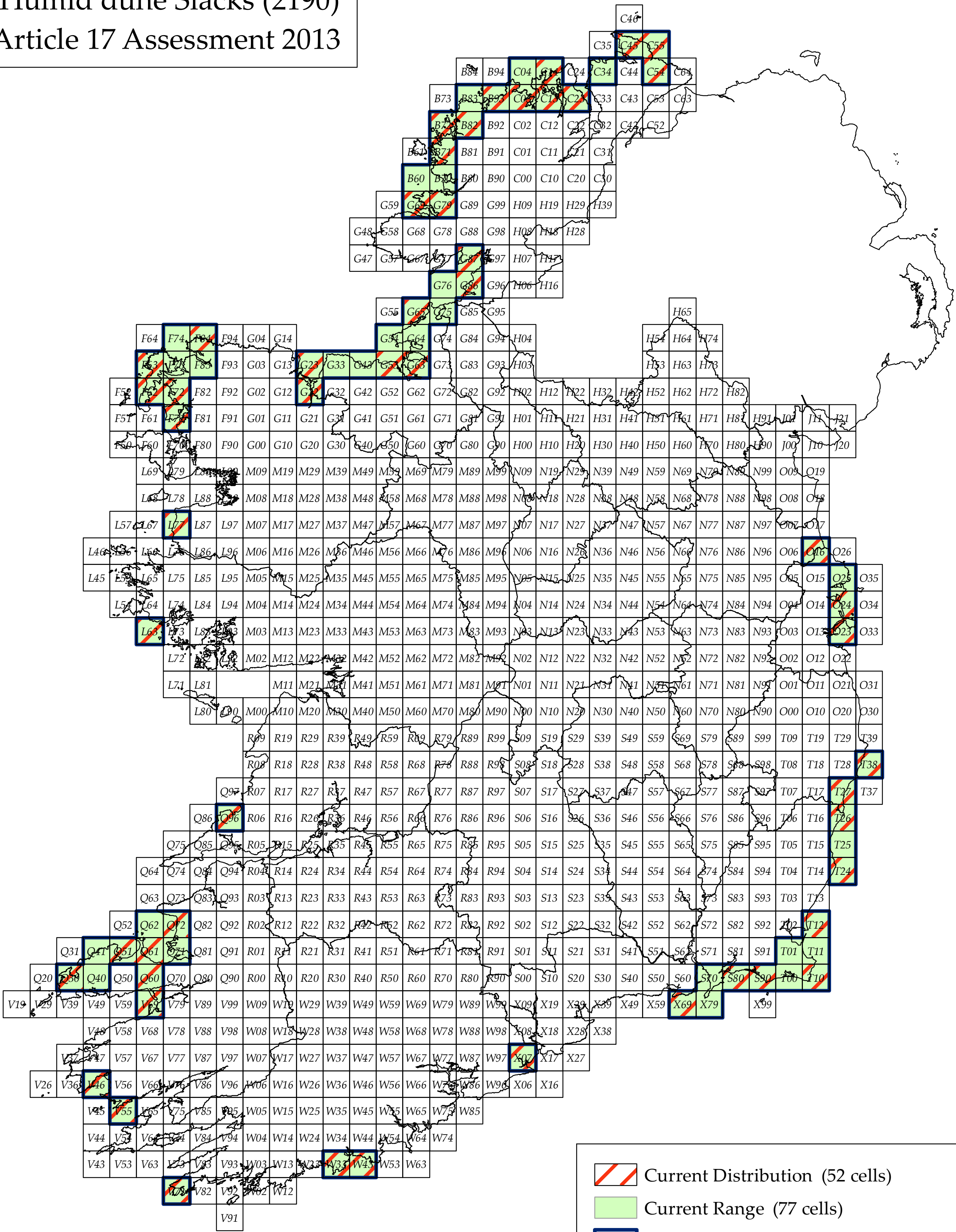
Field label	Note
Habitat code: 2190	
2.5 Main pressures	The main pressures on dunes with Salix repens continue to be linked to agriculture, recreation and interference with natural dynamics. Many sites have been modified in the past for developments such as sports pitches, golf courses, caravan parks, coniferous plantations, housing, roadways and airstrips. The top five pressures (ranked H) are: A04.01 Intensive grazing A04.03 Abandonment of pastoral systems, lack of grazing G02 Sport and leisure structures I01 Invasive non-native species M01 Changes in abiotic conditions Perhaps the greatest impacts relate to inappropriate grazing regimes. Intensive grazing or overgrazing can lead to a reduction in species diversity, nutrient enrichment of the soil and destruction of the vegetation cover. Undergrazing or lack of grazing associated with land abandonment can be equally negative as it leads to development of species-poor grassland and eventually to scrub encroachment. Recreation remains a pressure on most sites in some form and G01 which relates to outdoor sports and leisure activities including walking, horseriding, off-road vehicles etc. could just as easily have been given a high rating as G02, which includes golf courses, sports pitches and caravan parks, although the intensity of the impacts tend to be higher than for G01. The introduction on non-native species, particularly buckthorn (Hippophae rhamnoides) remains a problem on many sites, particularly along the east coast. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including fixed dunes.
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al. 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 2190 habitat were estimated by the surveyors on a site-by-site level. Pressures noted during the Coastal Monitoring Project (Ryle et al. 2009) from sites other than those covered by the SDM were included where these were thought to be be continuing. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits. Expert judgement was used to assess pressures that may have been overlooked in the field and to group pressures noted into the relevant codes. Negative impacts (pressures) were subsequently ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. Pressures which have a high incidence, combined with a high or medium intensity which impact a proportionally large area of 2130 Fixed dunes with herbaceous vegetation (grey dunes) habitat nationwide were ranked as having “High importance”, those with a low incidence with medium or low intensities and impact on a proportionally small area were ranked as having “Low importance”, while any other combination was ranked as having “Medium importance”. The top five ranking pressures were determined through a combination of the ranking system and expert judgement.

Field label	Note
Habitat code: 2190	
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell, 2009; Fealy and Murphy, 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats. The presence of coastal protection works will impact on dune habitats by (a) effectively cutting off the dunes from the beach, resulting in over-stabilisation of these naturally dynamic systems and (b) reducing the opportunity for new dune habitat formation. Climate change could also result in extended drought periods which would have a serious negative impact on wet slacks.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out at 28 sites in 2011-2012 to assess structure and functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least four of the species listed in 2.7.1 in more than 40% of stops and a further two species being present in over 20% of stops. In addition to the requirements listed above, there should also be a minimum of three species, as listed in 2.7.1, present in every stop.
2.7.04 Structure and functions - Methods used	Fixed dunes were mapped and assessed at 14 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded dunes with S. repens habitat from 17 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents 82% of the known sites, but over 82% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. During the SDM, ten criteria were assessed in the structure and functions assessment including typical species, presence of negative indicator species, non-native species indicators of rank conditions, non-native species, tree and scrub cover, bare ground cover, and the height of Salix repens. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established as follows: for sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample which was in Unfavourable condition. This was then expressed as a percentage of the total area of 2190 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad. Best expert judgement was used to extrapolate the data collected during the SDM to determine the conservation assessment of the habitat at a national level.
2.7.05 Other relevant information	92.1% of the habitat was assessed as being in favourable condition and 7.9% was assessed as being in unfavourable condition. This corresponds to an assessment of Unfavourable-Inadequate. The most frequent reasons for failure were lack of idicator species, cover of scrub, lack of braodleaved herbs, the proportion of bare ground and damage due to disturbance.

Field label	Note
Habitat code: 2190	
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Range is assessed as Unfavourable-Inadequate as the current range is below the favourable reference range, due to the disappearance of the habitat at a single sites due to anthropogenic factors. The reduction in range is less than 1% per year since the Coastal Monitoring Project, so range was assessed as Unfavourable-Inadequate.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	Loss of range since the 2007 report indicates a declining trend.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although the total habitat area appears to have increased it is unclear how much of this is an increase in real terms and not just that these areas were overlooked in previous surveys. However, there has been recorded anthropogenic loss at two sites. In both cases the habitat loss is considered to have been related to accelerated rates of drying caused by human activities. Habitat loss was equal to less than 1% per year, so area was assessed as Unfavourable-Inadequate.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	As there has been a net increase in the habitat area the trend is assessed as increasing.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	In 2011-2012, 92.1% of the habitat was assessed as being in Favourable status, while 7.9% was unfavourable. This is consistent with an Unfavourable-Inadequate conservation status. The most frequent reasons for the habitat to be assessed as Unfavourable-Inadequate were lack of indicator species, cover of scrub, lack of broad-leaved herbs, the proportion of bare ground and damage due to disturbance.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As there has been no change in since 2007 in the assessment of structure and functions, the trend is considered to be stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), Future Prospects were "evaluated by considering the future trends and likely future status" of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that "if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)". Future prospects were assessed as Unfavourable-Inadequate as per the evaluation matrix in Evans and Arvela (2011). Human-induced drying out of this habitat has wide implications for the natural functioning of this habitat, particularly in terms of pedogenesis and scrub and tree encroachment. These tow factors cause a feedback mechanism that drives desiccation and accelerates succession. Depletion of groundwater combined with the threat of dune stabilisation seriously threatens the future prospects of dune slacks. The presence of so many High and Medium importance threats combined with the knowledge that there are no known measures on a national level, and few measures on a site-by-site level, in place to prevent or remediate problems associated with human-induced drying out of 2190, suggests that the trend is declining.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The trend is assessed as declining because although the total area of the habitat is considered stable, the range of ecological variation is not. The two extreme communities (pioneer slacks and very wet slacks) are poorly represented in Ireland, partly due to the age of many of our dune systems and the depletion of available sediment, as well as human activities that disrupt their natural function through overstabilisation of dune systems and interference in the local hydrological regime. Dune slacks are ranked as one of the habitats most sensitive to changes in groundwatrer levels and quality. It is evident that the situation is continuing to deteriorate and without developing a better understanding of their management needs the habitat is under serious threat.

Field label	Note
Habitat code: 2190	
2.8.05 Overall assessment of Conservation Status	There is evidence that there has been deterioration in range, with a loss of two grid squares since 2007, therefore range was assessed as Unfavourable-Inadequate. Area was assessed as Unfavourable-Inadequate (increasing) as although there were reported anthropogenic losses there was a net increase in Area. However, the extent to which this increase is genuine rather than the habitat having been overlooked in earlier surveys is unknown. Structure and functions were assessed as Unfavourable-Inadequate with 92.1% of the habitat in Favourable condition. The most frequent reasons for the habitat to be assessed as Unfavourable-Inadequate were lack of indicator species, cover of scrub, lack of broad-leaved herbs, the proportion of bare ground and damage due to disturbance. There was no change in the assessment and the trend was stable. Although Structure and Fnctions were assessed as Unfavourable-Inadequate in this reporting period, it should be noted that there is no criterion used to assess the hydrological functioning of the habitat in the monitoring methodology. In addition, it is difficult to distinguish between natural and anthropogenic succession in the field. Future prospects were assessed as Unfavourable-Inadequate (declining) due to the on-going threats from interference in the local hydrology, overstabilisation of dunes, recreation and agriculture. The range of ecological variation within the habitat is also under threat, with pioneer slacks and very wet slacks being poorly represented in Ireland. The overall conservation status of 2190 was assessed as Unfavourable-Inadequate (declining).
2.8.06 Overall trend in Conservation Status	The overall trend is declining in view of the ongoing pressures and threats outlined in 2.5 and 2.6.
3.1.01 a) Surface area - Minimum	An intersection was carried out using the 2190 habitat polygons and NPWS SAC polygon. 1.54km2 is included as a Qualifying Interest within an SAC, while 0.9km2 is within an SAC but is not listed as a Qualifying Interest for the site.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value = max value.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring (SDM) project were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2190 had been recorded and mapped within SAC boundaries. The figure presented in 3.1 is the sum of all of those areas. It is the most accurate figure that could be derived based on the available information.
3.1.03 Trend of surface area within the network	Anthropogenic loss of 2190 has been recorded within the NATURA 2000 network. Trend is therefore declining. The additional area of habitat recorded does not represent an actual increase as much of this habitat was just overlooked during the earlier survey work.
3.2 Conservation measures	Some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Work has progressed to restore some coastal areas after exploitation for agriculture or tourism, and this has had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off shore sediment has been regulated and this has reduced the effects of sediment depletion. Implementation of measures to prevent damage due to disturbance and interference with sediment dynamics would be beneficial. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat.

Humid dune Slacks (2190)
Article 17 Assessment 2013



Current Distribution (52 cells)
Current Range (77 cells)
Favourable Reference Range (77 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
05-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 21A0

NAME: Machairs (* in Ireland)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1996-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Crawford, I., Bleasdale, A. and Conaghan, J. (1996). Biomar Survey of Irish machair sites, 1996. Irish Wildlife Manuals, No. 3. Duchas, The Heritage Service, Dublin.

Delaney, A., Devaney, F.M. and Barron, S.J. (2013). Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. XXX, National Parks and Wildlife Service, Dublin.

Farrell, G.J. (2009). Climate Change – Impacts on Coastal Areas. A paper prepared for the presentation at a workshop on 'Ireland at Risk', for the years 2050 and beyond.

Fealy, R. and Murphy, C. (2009). The Likely Physical Impacts of Future Climate Change on Inland Waterways and the Coastal Environment in Ireland. In: Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways (Kelly, B. and Stack, M., Eds). The Heritage Council of Ireland Series, pp 39-54.

Gaynor, K. (2008). The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, University College Dublin.

Gaynor, K. (2006). The vegetation of Irish machair. Biology and Environment. Proceedings of the Royal Irish Academy, 106B (3): 311-321.

NPWS (2013). Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp)

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009). Coastal Monitoring Project (2004-06). Unpublished report for the National Parks & Wildlife Service, Dublin.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	5900		
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.3.3 Short-term trend period	2001-2012		
2.3.4 Short-term trend direction	stable (0)		
2.3.5 Short-term trend magnitude	min	max	
2.3.6 Long-term trend period			
2.3.7 Long-term trend direction	N/A		
2.3.8 Long-term trend magnitude	min	max	
2.3.9 Favourable reference range	area (km²)	5900	
	operator	N/A	
	unknown	No	
	method	Favourable reference range is equal to the current range as there is no evidence of loss since the Habitats Directive came into force. The apparent increase in range is primarily an artefact of the new method of calculating range which was used in 2012.	
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method		

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	29.42				
2.4.2 Year or period	2004-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.2	max		confidence interval
2.4.7 Short term method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	32.18			
	operator	N/A			
	unknown	No			
	method	The Sand Dunes Monitoring project (SDM) mapped machair habitat from 12 of the 39 sites that were revisited in 2011-2012 (Delaney et al. 2013). The SDM data was compared to the data produces for the same sites during the Coastal Monitoring Project (CMP) (Ryle et al. 2009). It was determined that the area of this habitat had been under-estimated during the CMP by approximately 14.12%. Based on the assumption that this under-estimation is representative of the entire CMP survey, the original national area submitted in 2007 of 2753ha is increased by 14.12% to give a revised national area for 2007 of 3142 ha (31.42km2). Losses of 2.35% were recorded during the CMP which means that the FRA should have been set at 3218ha (32.18km2). This is now used as the revised FRA but this figure may be further revised in light of additional survey work.			
2.4.13 Reason for change	Improved knowledge/more accurate data				

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
Fertilisation (A08)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Restructuring agricultural land holding (A10)	high importance (H)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	medium importance (M)	N/A
Pollution to groundwater (point sources and diffuse sources) (H02)	medium importance (M)	N/A
Flooding modifications (J02.04)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
abiotic (slow) natural processes (K01)	high importance (H)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
intensive grazing (A04.01)	high importance (H)	Nitrogen input (N)
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
Fertilisation (A08)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Restructuring agricultural land holding (A10)	high importance (H)	N/A
Forest and Plantation management & use (B02)	low importance (L)	Acid input/ acidification (A)

Sand and gravel extraction (C01.01)	medium importance (M)	N/A
Roads, paths and railroads (D01)	medium importance (M)	N/A
discontinuous urbanisation (E01.02)	medium importance (M)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	medium importance (M)	N/A
Sport and leisure structures (G02)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Trampling, overuse (G05.01)	medium importance (M)	N/A
Pollution to groundwater (point sources and diffuse sources) (H02)	medium importance (M)	N/A
Flooding modifications (J02.04)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
sea defence or coast protection works, tidal barrages (J02.12.01)	medium importance (M)	N/A
abiotic (slow) natural processes (K01)	high importance (H)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 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	
2.7.2 Species method used	Species listed in 2.7.1 represent the selection of species that were deemed to provide the best indication of whether 21A0 was present. The species were selected following a literature review, taking into account the species listed in the Interpretation manual of European habitats, the JNCC guidelines, the Coastal Monitoring Project (Ryle et al., 2009) and relevés collected in 2011 as part of the Sand Dune Monitoring Project (Delaney et al., 2013).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	In total, eleven criteria were assessed in the structure and functions assessment of 21A0. As well as typical species, presence of negative indicator species, native and non-native invasive species, sward height, bare ground and proportion of the vegetation able to flower or fruit were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. See Delaney et al. (2013) for a full list of structure and functions criteria assessed. Sand dune systems (including machair) are dynamic systems and in some cases, the habitat may not fulfil all of the structure and functions criteria or the area might decrease for natural reasons which are not related to anthropogenic activities. The methodology sought to allow for natural habitat variation, but in some cases expert judgement was used in the assessment. 8.87 km2 is listed as a Qualifying Interest within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	25.25	max	25.25
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			

3.1.3. Trend of surface area decrease (-)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Recurrent One-off	low importance (L)	Inside	
Managing water abstraction (4.3)	Recurrent One-off	low importance (L)	Both	Enhance
Restoring coastal areas (4.4)	Recurrent	low importance (L)	Inside	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Specific single species or species group management measures (7.4)	Recurrent	low importance (L)	Both	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Recurrent	low importance (L)	Outside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 21A0	
0.2 Habitat code	Machairs, are complex, dynamic systems which are considered natural landforms that are the product of both wind erosion and cultural activities. They are globally restricted to the northwest 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.
1.1.02 Method used - map	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al., (1996) were used as the basis for the 21A0 distribution map. Supplementary information was gathered from sources listed in 2.2.
1.1.03 Year or period	Based on the list of sources used to generate the distribution map
1.1.04 Additional distribution map	21A0 polygons from various data sources (see section 2.2) were intersected with the ING 10 square grid to determine the national grid distribution. The habitat was found in 41 grid squares. The distribution increased by two grid squares in comparison with 2007 because of improved knowledge.
1.1.05 Range map	A range map was derived from the distribution map (1.1.4) using the range tool.Two cells generated by the range tool were removed from the range map as they do not possess any coastline and therefore could not support the habitat.
2.2 Published sources	The Coastal Monitoring Project (CMP) represented the first comprehensive assessment of sand dune systems and their habitats in Ireland (Ryle at al., 2009). A total of 181 sites were identified, mapped and each habitat present assessed. 59 of these sites supported machair habitat (21A0). Guidelines for future monitoring were also developed. Delaney et al. (2013) monitored a subset of 39 dune sites between 2011 and 2012, including 12 of the sites that supported machair habitat (21A0), as part of the Sand Dunes Monitoring project (SDM). In addition, the SDM further refined the methodology for monitoring dune habitats. Additional information from the Biomar Survey of Irish Machair (Crawford at al., 1996) and other sources as listed under Section 2.2 (excluding Farrell (2009), Fealy & Murphy (2009) and Gaynor (2008)), were used to compliment this data. Gaynor (2006, 2008) provided additional background information on the habitat. The NPWS Site Inspection Reporting database was used to determine if any significant impacts on the habitat had been recorded in addition to those recorded by Delaney et al. (2013). Implications of climate change were derived from Farrell (2009) and Fealy & Murphy (2009).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.

Field label	Note
Habitat code: 21A0	
2.3.02 Method used - Range	Delaney et al. (2013), Ryle et al. (2007) and Crawford at al. (1996) were used as the basis for the distribution map for 21A0 Machair. Supplementary information was gathered from sources listed in 2.2 and the final distribution was used to produce the range map. The range was generated by applying the range tool supplied by NPWS to the distribution map referred to in 1.1.1. Two cells were removed from the final range map as they did not possess any coastline and therefore could not support the habitat.
2.3.03 Short-term trend - Period	Evans and Arvela (2011) guidance document states: "The period for short-term trend is 12 years (2 reporting cycles). For the 2013 reports this means a period of 2001-2012 or a period as close as possible to this".
2.3.04 Short term trend - Trend direction	The Favourable Reference Range given in 2007 was 4400km2. The apparent increase in range is an artefact of the new method of calculating range which was used in 2013.
2.3.10 c) Reason for change - use of different method	See 2.3.4.
2.4.01 Surface area	The area mapped at sample sites during the Sand Dunes Monitoring project (11.31km2) was added to the area of 21A0 mapped at all of the other sites during the Coastal Monitoring Project (18.11Km2) to give a total area of 29.42km2. No point data were included. Some habitat located within golf courses was not considered. The area mapped during the Coastal Monitoring Project (CMP) was revised after a sample of thirty nine sites were visited during the Sand Dunes Monitoring project (SDM) in 2011-2012. The area within the sample sites was increased by 14.12%. The change in area was not consistent across all of the sites assessed during the SDM so it should not be assumed that the area of the habitat at all sites was underestimated during the CMP. The polygons mapped by Delaney et al. are as true as possible a representation of the size and shape of the habitat on the ground.
2.4.02 Year or period	Field surveys were carried out at 181 sites between 2004 and 2006 as part of the Coastal Monitoring Project and follow up surveys were carried out at a sample of 39 sites between 2011 and 2012 as part of the Sand Dunes Monitoring project.
2.4.03 Method used - Area covered by habitat	Field surveys for 181 sites were carried out between 2004 and 2006 and follow up surveys were carried out at a sample of thirty-nine sites between 2011 and 2012.
2.4.04 Short-term trend - Period	The trend reported in 2013 is based on a comparison of the habitat maps from the Sand Dunes Monitoring project (surveyed in 2011-2012) with those from the Coastal Monitoring Project (surveyed in 2004-2006). It is not possible to estimate the amount of loss which occurred in the years between 2001 and 2004. The loss of 2.35% since implementation of the Habitats Directive which was reported in 2007 was not based on any clear evidence and may have included habitat loss due to natural processes.
2.4.05 Short-term trend - Trend direction	Increases reported during the SDM were due to the redrawing of boundaries and do not represent increases in the habitat since the CMP. The increase recorded from the recovery of part of the system at Garter Hill represents an improvement in the Structure & Function rather than the area. There has, however, been anthropogenic loss of habitat at four sites (Doonloughan, Dooaghtry, Aghleam and Derrybeg) during the current reporting period. These losses represent a decreasing trend, however the losses are minor.

Field label	Note
Habitat code: 21A0	
2.4.06 a) Short-term trend - Magnitude - Minimum	Direct anthropogenic loss has affected 6.47ha of 21A0 habitat since 2006. This is equal to a loss of 0.2% of the total habitat area.
2.4.07 Short-term trend - Method used	Based on field surveys in 2004 - 2006 for the Coastal Monitoring Project and surveys of the 39 sites revisited during the Sand Dunes Monitoring project in 2011-2012.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	An increase of 1.73 km2 is the result of improved knowledge. Overall, there was an increase of 0.15 km2 due to natural processes of accretion and succession, as well as some recovery of the habitat.

Habitat code: 21A0

Field label	Note
2.5 Main pressures	The main pressures experienced by machair systems continue to be linked to agriculture and recreation, as well as interference with natural dynamics and hydrology. Machairs remain under threat from a range of impacts including overgrazing, undergrazing, over-stabilisation of dunes, water abstraction and drainage, golf course developments, forestry and coastal protection works. Many sites have been modified in the past for developments such as sports pitches, golf courses, caravan parks, coniferous plantations, housing, roadways and airstrips. The top five pressures (ranked H) are: A04.01 Intensive grazing A10 Restructuring agricultural land holding G02 Sport and leisure structures K01 Erosion M01 Changes in abiotic conditions The most important influence on the nature and vegetation of a machair plain is the restructuring of agricultural land holdings, with open commonage areas being divided and fenced into strips. Other pressures include agricultural activities such as overgrazing and improvement through the application of fertilisers; recreational activities including horseriding, golfing, caravan/camping and the associated vehicular traffic and trampling; sand and water extraction. Erosion and climate change are linked but they are equally important. Machair is unusual in that this is a habitat that is formed as a result of erosional processes. It is important that this process can continue but it can be exacerbated by human activities and become a problem. Overstabilisation (often linked with coastal protection works) is become a serious threat to the structure and functions of all dune and machair habitats in Ireland. Many machair systems are wet in nature, lying in close proximity to the local ground water-table. Some are backed by fens or even open lakes. Any interference with the hydrological regime within machair is highly detrimental to the functioning of the habitat. Water abstractions from groundwater can cause problems by drying out the surface. Pollution to the local groundwater (e.g. fertiliser application, excessive nutrients) can also manifest in machair vegetation and localised drainage can lead to nutrient enrichment of these areas. The spread of one-off housing with seepage areas may have a cumulative negative impact on the quality of the local watertable.This is another reason why intensive grazing can be particularly damaging. Further research is required in Ireland to gain a better understanding of the hydrological requirements of machair in terms of management. Recreation remains a pressure on most sites in some form and G01 which relates to outdoor sports and leisure activities including walking, horseriding, off-road vehicles etc. could just as easily have been given a high rating as G02, which includes golf courses, sports pitches and caravan parks, although the intensity of the impacts tend to be higher than for G01. M01 relates to changes in biotic conditions and covers the main impacts of climate change, including sea level rise, flooding risk, drought, wave exposure all of which impact on dune habitats, including machair.

Field label	Note
Habitat code: 21A0	
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-2012 (Delaney et al. 2013) have been used in this assessment, where the intensity, effect and extent of each impact on 21A0 habitat were estimated by the surveyors on a site-by-site level. Negative impacts (pressures) were ranked using a system which combined frequency of occurrences (incidence) with the area impacted on and intensity level. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated, and data from the Foreshore Deed Book was examined for any other potential pressures not picked up on during the monitoring survey or by ranger site visits.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures, the list is the same for threats, with the addition of climate change and coastal protection works. Horse grazing and quarrying were removed from the list shown in 2.6 as a maximum of 20 threats can be listed here. Predictions based on climate change scenarios include a rise in mean sea level and an increase in the frequency and severity of coastal storms (Farrell 2009; Fealy & Murphy 2009). Both of these will have a significant effect on coastal erosion and flooding, which in turn will have an impact on the natural processes needed to create and maintain dune habitats. The presence of coastal protection works will impact on dune habitats in a similar fashion by reducing the opportunity for new dune habitat formation.
2.6.01 Method used - Threats	Refer to Section 2.5 and 2.5.1
2.7.02 Typical species - method used	Monitoring surveys were carried out in 2011-2012 (Delaney et al. 2013) to assess Structure and Functions in monitoring plots within Annex I habitats. Assessment was on the basis of the presence of at least 6 species listed in over 20% of the monitoring stops and at least 3 species being present in every stop.

Field label	Note
Habitat code: 21A0	
2.7.04 Structure and functions - Methods used	Fixed dunes were mapped and assessed at 12 of the 39 sites revisited during the Sand Dunes Monitoring (SDM) project (Delaney et al. 2013). The Coastal Monitoring Project (CMP) recorded machair habitat from 59 sites (Ryle et al 2009). This subset of sites assessed by the SDM represents just over 20% of the known sites, but over 33% of the total national resource as determined by the CMP. It is therefore considered representative of the habitat in Ireland. n total, eleven criteria were assessed in the structure and functions assessment of 21A0, including typical species, presence of negative indicator species, cover of bryophytes, native and non-native invasive species, sward height, bare ground and proportion of the vegetation able to flower or fruit were assessed. Interference with sediment availability and disturbance were also considered. Continued presence of rare species was assessed where relevant. The percentage of the habitat at each site in Favourable condition was established. For sites where the structure and functions were assessed as Favourable, 100% of the area was considered to have Favourable structure and functions. For sites where structure and functions were assessed as Unfavourable-Inadequate or Unfavourable-Bad, the area of the habitat which was in Unfavourable condition was calculated using a combination of mapping data (scrub cover etc.), the information recorded at the monitoring stops and expert opinion. The percentage of the habitat at each site which was affected by negative pressures was also consulted. The areas in Unfavourable condition within the sample sites were then added together to give the total area of the habitat within the sample sites which was in Unfavourable condition. This was then expressed as a percentage of the total area of 21A0 within the sample. Structure and functions of the habitat were assessed as Favourable if 99-100% of the total habitat area in the sample was assessed as being in Favourable condition. If 75-98% of the habitat was in Favourable condition, the habitat was assessed as Unfavourable-Inadequate. If less than 75% of the habitat was in Favourable condition and the remainder was in Unfavourable condition, the habitat was assessed as Unfavourable-Bad.
2.7.05 Other relevant information	In 2011-2012, 66.4% of the habitat was assessed as Unfavourable and 33.6% was assessed as Favourable, which is consistent with an assessment of Unfavourable-Bad. The criteria which failed most frequently assessed sward height, negative indicator species and damage due to disturbance. Cover of bryophytes failed at two sites and the criteria assessing positive indicator species and bare ground each failed at one site.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is taken to be the favourable reference range as it does not appear to have decreased since designation and is adequate to retain the regional diversity of the habitat in Ireland
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Area was assessed as Unfavourable-Inadequate as it is >2% below the Favourable Reference Area.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Although minor losses have occurred since 2007 these loss are considered negligible and the qualifier is set as stable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	In 2011-2012, 66.4% of the habitat was assessed as Unfavourable which is consistent with an assessment of Unfavourable-Bad. The criteria which failed most frequently were sward height, negative indicator species and damage due to disturbance. Cover bryophytes failed at two sites and the criteria of positive indicator species and bare ground each failed at one site.

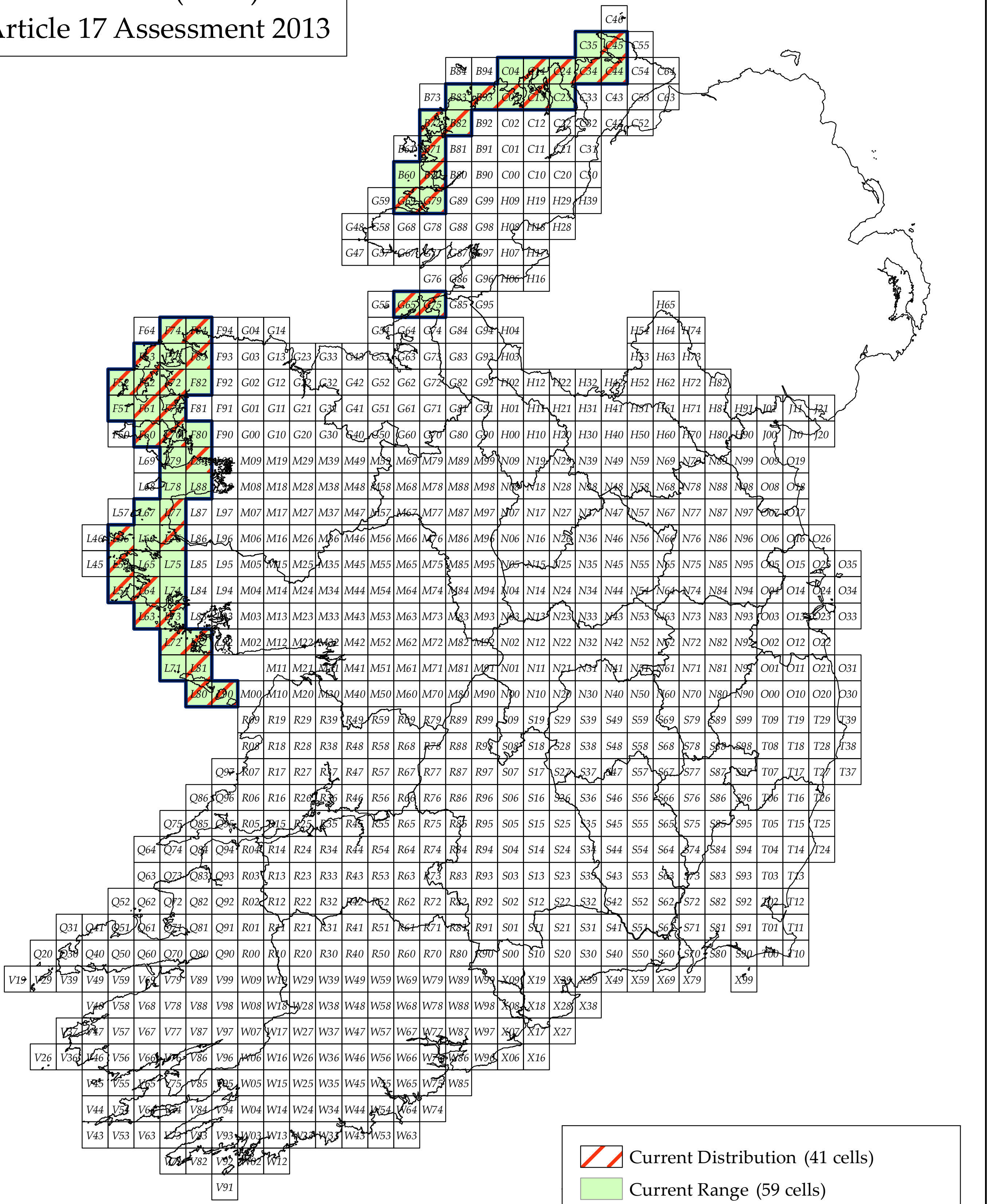
Habitat code: 21A0

Field label	Note
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In 2007, 78% of the habitat was assessed as being in Unfavourable condition (including both Unfavourable-Inadequate and Unfavourable-Bad), and the habitat was assessed as Unfavourable-Bad. The difference in the percentage in Favourable and Unfavourable condition between the 2007 asssessment and the current assessment is likely to be the result of changes in the method of calculating the percentage of the site in Unfavourable condition. Alternatively, more monitoring stops may have been placed in areas of agricultural intensity. The inclusion of regenerating areas is expected to have a negative effect on the structure and functions assessment because these areas have not recovered sufficiently be in good condition. On balance, the situation remains bad but has not worsened since 2007.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As per instruction in Evans and Arvela (2011), future prospects were “evaluated by considering the future trends and likely future status” of the parameters range, area and structure and functions. The future trends are dependent on the threats listed in section 2.6, as well as any conservation practices or other positive factors that will influence the future status of habitat in question. Evans and Arvela (2011) also state that “if this field indicates a number of threats of high or medium importance then the future trend of one or more parameters will very likely be decreasing (unless there are measures in place to avoid this)”. 21A0 has a total of 24 threats recorded by Delaney et al. (2013), 20 of which are presented in section 2.6 as per instruction in Evans and Arvela (2011). The other threats are intensive cattle grazing, mining and quarrying, non-intensive horse grazing and agricultural structures in the landscape, all of which ranked as “Low importance (L)”. Of the twenty presented in section 2.5, 5 are “High importance (H)” pressures and 5 are “Medium importance (M)” pressures. The most important threats are non-intensive sheep grazing , damage by herbivores (rabbit grazing and digging), erosion and agricultural intensification (reseeding, etc.). No measures to alter the main effects were consistently applied across all sites where the impacts were occurring, although there appeared to have been some effort to reduce sheep stocking densities and control rabbit populations at individual sites. Area was assessed as Unfavourable-Inadequate and structure and functions were assessed as Unfavourable-Bad. The impairments to structure and functions are reflected in the pressures recorded. In the absence of additional conservation measures, the current threats will continue to act on the habitat, maintaining it in Unfavourable-Bad condition for the next two reporting periods. Agricultural policy within Ireland, particularly in response to CAP reform due to be finalised in 2013, will have an impact on the future conservation status of 21A0. As CAP reform has not been agreed, it is not taken into account in this assessment. Farmers in receipt of payments under the Single Payment Scheme are required to maintain land in good agricultural and environmental condition (GAEC). On machairs, however, lands that are considered to be overgrazed from an ecological perspective may not be in breach of the current GAEC standards
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	There are no known measures on a national level, and few to no measures on a site level, in place to prevent problems associated with overgrazing (livestock and rabbits) and disturbance. While there is nothing to suggest that disturbance levels will increase, the situation is unlikely to improve due to overgrazing and its associated pressures. Future Prospects were assessed as Unfavourable-Bad in the last reporting period and as Unfavourable-Bad in this reporting period. The qualifier is therefore stable.

Field label	Note
Habitat code: 21A0	
2.8.05 Overall assessment of Conservation Status	The current range is taken to be the favourable reference range as it does not appear to have decreased since designation and is adequate to retain the regional diversity of the habitat in Ireland. Area was assessed as Unfavourable-Inadequate (stable) as losses of >2% have occurred since the Directive came into force, however recent losses are considered negligible. Structure and functions were assessed as Unfavourable-Bad, with 66.4% of the habitat in Unfavourable condition. The criteria which failed most frequently assessed sward height, negative indicator species and damage due to disturbance. Cover bryophytes failed at two sites and the criteria assessing positive indicator species and bare ground each failed at one site. Future prospects were assessed as Unfavourable-Bad. Disturbance and inappropriate grazing regimes have resulted in the structure and functions of the habitat being assessed as Unfavourable-Bad, and these pressures are expected to maintain the habitat in its current condition. Because two of the parameters were assessed as Unfavourable-Bad, the conservation status of 21A0 is Unfavourable-Bad.
2.8.06 Overall trend in Conservation Status	There has been no change in any of the parameters since 2007 and the overall trend is stable.
3.1.01 a) Surface area - Minimum	An intersection was carried out using the 21A0 habitat polygons and NPWS SAC polygon.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has no confidence intervals and has been calculated as accurately as possible. Therefore min value = max value.
3.1.02 Method used	The habitat maps generated during the Sand Dunes Monitoring project (SDM) were combined with the habitat maps for all of the other sites assessed during the Coastal Monitoring Project (CMP). The resulting shapefile was intersected with the latest NPWS SAC shapefile to find the areas where 2120 had been recorded and mapped within SAC boundaries. The figure presented in 3.1.1 is the sum of all of those areas.
3.1.03 Trend of surface area within the network	Anthropogenic habitat loss has occurred within the SAC network.

Field label	Note
Habitat code: 21A0	
3.2 Conservation measures	Further measures are needed to prevent damage related to agriculture and recreation. Areas of sand dune habitat have been lost to extreme storm events over the reporting period and these may or may not be related to climate change. There is no known measure to combat this threat. However, some measures are in place and have a beneficial effect. Much of the habitat is included within the Natura 2000 network where management of the habitat is governed by strict regulations. Further information regarding habitat regulations can be obtained from the NPWS website (http://www.npws.ie/legislationandconventions/irishlaw/euregulations/). Efforts have been made to restore some coastal areas after exploitation for agriculture or tourism, and these have had varying levels of success to date. Often, the measures involve putting in place more structured access routes to beaches. Exploitation of on-shore and off-shore sediment has been regulated and this has reduced the effects of sediment depletion. The management of water abstraction to prevent the water table becoming artificially low is necessary to maintain the presence of the habitat. Where management of rabbit populations occurs, this is beneficial to the habitat. Much of the machair resource is held in commonage which is managed through commonage framework plans. However,regulation of agricultural activities is more challenging in areas where that formerly were commonage have been divided into fenced strips.

Machair (21A0)
Article 17 Assessment 2013



Current Distribution (41 cells)
Current Range (59 cells)
Favourable Reference Range (59 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3110

NAME: Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	

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Visser, G and Zoer, J.A. (1976) Abbreviated report of a botanical and malacological study performed in the southwestern part of Ireland. August 1976. Unpublished Report to National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	22900	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	22900
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. This is smaller than the FRR set in 2007 (65,100 km2) owing to the improved method of mapping the habitat's distribution. The main

	reasons for the reduction were: 1. a better understanding of the habitat, 2. the separation of habitats 3110 and 3130, which were not distinguished in 2007, 3. the mapping of natural eutrophic lake habitat (3150), which was not mapped in 2007, 4. the removal of turloughs, lagoons and other non-lake segments, and 5. the removal of lake segments of less than one hectare in area unless site-specific information identified the presence of the habitat in the small lake/pond. It should be noted that Range is likely to be an insensitive measure for the conservation status of lake habitats. Lakes can be 'created' by the damming of rivers and while their area can be reduced through drainage or processes of natural succession, they are unlikely to be destroyed. In a temperate, oceanic climate such as that of Ireland, it is unlikely that the range of habitat 3110 will ever change. The quality of the habitat (structures and functions) may deteriorate significantly and this is the key measure of the conservation status of the habitat. It is assumed throughout this assessment that restoration of habitat 3110 is possible regardless of the severity of the deterioration in habitat quality.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	407.1		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period	1989-2012		
2.4.9 Long-term trend direction	stable (0)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.12 Favourable reference area	area (km)	407.1	
	operator	N/A	
	unknown	No	
	method	The current surface area, derived by summing the lake surface areas, is considered to be the Favourable Reference Area (FRA), as there is no evidence of a decline since the Directive came into force. This is smaller than the FRA set in 2007 (678 km2) owing to the different method of mapping the habitat's distribution. The main reasons for the reduction were the removal of lake segments of less than one hectare in area unless site-specific information identified the presence of the habitat, the separation of habitats 3110 and 3130, which were not distinguished in 2007, and the improved knowledge of the distribution of the natural eutrophic	

lake habitat (3150), which was not mapped in 2007.

2.4.13 Reason for change

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

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
Utricularia minor
Eleogiton fluitans

2.7.2 Species method used	Expert judgement together with EPA macrophyte raw data from routine Water Framework Directive monitoring (2007-2012) were used to determine the status of typical species as part of the overall assessment of the structure and functions.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Range and Area are likely to be insensitive measures for the conservation status of lake habitats and are unlikely to change significantly between reporting periods. The quality of the habitat (structures and functions) is the key measure of the current conservation status of the habitat. The structure and functions assessment, combined with information on pressures and their associated drivers, determine the future prospects assessment. An estimated 5,960 ha or 59.6 km2 of lake area was considered to have habitat 3110 within the 32 SAC where habitat 3110 is a qualifying interest for the site. The habitat is not mapped as occurring in a number of SAC designated for its protection. There are two reasons for these anomalies. The first is a change in the EU interpretation of habitats 3110 and 3130. In the EU interpretation manual (Version 12 of 1995) that was available at the time of the selection of Irish lake habitat SAC, habitat 3130 was described as “Oligotrophic to mesotrophic standing waters of plains to subalpine levels of the Continental and Alpine Region and mountain areas of other regions . .” The interpretation used

by the NPWS at the time was, therefore, to designate upland, predominately corrie lakes as SAC for habitat 3130 as Ireland is within the Atlantic Region and to select lowland, coastal and mixed geology lakes containing Najas flexilis for 3110. The reference to 'mountain areas' was removed from subsequent versions of the manual. One consequence was the incorrect selection of SAC for 3110 and Najas flexilis. This macrophyte is a character species of habitat 3130, and habitat 3110 is seldom present in Najas flexilis lakes. These anomalies can readily be addressed by selection of the SAC for 3130, rather than 3110. The second reason for the inconsistencies is that the lake waterbodies in the SAC may not have been examined during the distribution mapping process and, therefore, not mapped as part of the distribution.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	declining (-)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	70.1	max	70.1
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 3110	
0.2 Habitat code	Habitat 3110, Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) occurs in soft water, nutrient poor lakes frequently associated with acid bedrock (notably granite and old red sandstone) overlain by peatland. The habitat is best developed on more gently sloping lake beds, over variable substrata, and along sheltered shorelines. It is dominated by species with an isoetid growth form, namely Isoetes lacustris, Isoetes echinospora, Littorella uniflora, Lobelia dortmanna and Eriocaulon aquaticum. Juncus bulbosus, Myriophyllum alterniflorum, Potamogeton polygonifolius and Sparganium angustifolium also frequently occur, as does Deschampsia setacea in Connemara. Ireland is a stronghold for the habitat, given the large number of lakes in which it occurs and its widespread distribution. Even in Ireland, however, the oligotrophic waters containing very few minerals habitat is under significant pressure from eutrophication, peatland drainage and, to a lesser extent, acidification.
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

Habitat code: 3110

Field label	Note
1.1.02 Method used - map	The distribution of habitat 3110 in Ireland was based on mapped lakes. The “WFD_LakeSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 12,217 separate polygons. A number of rules were applied during the process of assigning habitat 3110 to these polygons, in summary: 1. Polygons for the priority habitat coastal lagoons (habitat code 1150) were removed from the dataset. 2. Habitat 3110 was not assigned to any segments of less than 1 ha in area unless site-specific data or knowledge existed to demonstrate its presence. Lake habitats do not generally develop in waterbodies of less than 6 ha, so the 1 ha rule may overestimate the area of habitat 3110 in Ireland. 3. Habitat 3110 was not assigned to any turlough polygons (priority habitat 3180). 4. Habitat 3110 was assigned to lakes that also contain habitats 3160 (Natural dystrophic lakes and ponds) and 3130 (Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea) and, at a limited number of sites, 3140 (Hard oligo-mesotrophic waters with benthic vegetation of Chara spp). 5. Data on aquatic macrophytes were used to identify lakes with habitat 3110. The principal data sources for habitat 3110 were the EPA routine Water Framework Directive macrophyte monitoring (data from 2001-2012 used), Free et al. (2006, 2009) and Heuff (1984). 6. Geological data, physico-chemical data, satellite imagery and orthophotography were used, in combination with expert judgement, to identify lakes with 3110 for which no macrophyte data were available. a. Habitat 3110 was assigned to high altitude lakes (> 200 m) of greater than 1 ha in area. b. Habitat 3110 was assigned to lakes surrounded by peatland (upland and Atlantic blanket bog and wet heath) of greater than 1 ha in area. 9. The full distribution of habitat 3110 was reviewed and corrections made as necessary. The full distribution mapping process is detailed in Appendix II of the lake habitat backing document (O Connor, 2013b). This process resulted in a map of the lakes in which habitat 3110 occurs. Of the 3,719 lakes with an area of greater than 1 ha in the national dataset, 2,505 were examined and 1,269 were classified as having habitat 3110. Seven lakes of less than 1 ha in area were also classified as having habitat 3110. The distribution of the habitat was based on these 1,276 lake segments. The 1,276 lake segments with habitat 3110 were intersected with the Irish National 10 km Grid, producing a distribution of 172 10 km squares. The habitat was distributed across 1,269 lakes in 14 counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Kildare, Leitrim, Mayo, Monaghan, Sligo, Tipperary, Waterford, and Wicklow). There may be some omissions from the distribution, notably in north-west Mayo, owing to the fact that not all lake segments could be examined in the available time. The rules adopted for distribution mapping differed from those used in 2007 in a number of respects, most significantly in that, in 2007: 1. Only one lake habitat was assigned to each lake, 2. A lake habitat was assigned to 11,924 WFD lake polygons from the 2007 dataset, including ponds of < 1 ha in area, coastal lagoons and turloughs. For this assessment (2013), lake habitats were assigned only to segments that were examined as detailed above. Lake habitat were not assigned to 476 segments (or 7.1% of the polygons examined, by number) because they were found to be turloughs, lagoons, artificial ornamental ponds, mill ponds, reservoirs, fens, bogs,

Habitat code: 3110

Field label	Note
	quarry ponds, mine tailings or other (often non-wetland) features. 3. Lake habitats 3110 and 3130 were not distinguished and 7,728 lake polygons were assigned to the combined category "3110/3130", 4. No lake polygons were classified as having lake habitat 3150.
1.1.03 Year or period	The distribution was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs. Macrophyte data used were of various ages, but principally dated from the period 2001-2012.
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps using the recommended Range Tool. Owing to geological and edaphic factors, as well as the presence of other habitats, some of the unoccupied 10 km squares within the range are very unlikely to contain habitat 3130.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressure and threats.
2.3.02 Method used - Range	See 1.1.2, 1.1.4 and 1.1.5 above, and O Connor (2013b) for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.09 a) Favourable reference range - In km2	As there is no evidence of a decline in range since the Directive came into force, the area of the range is large at approximately 30% of the terrestrial grid and the habitat is widespread (covering 14 counties), it can be assumed that the current range is large enough to allow the long-term survival of the habitat. As a result, the current range is set as the Favourable Reference Range. This FRR represents an improvement on that reported in 2007, in which habitat 3110 was not separated from habitat 3130.
2.3.10 a) Reason for change - genuine change?	There has been no genuine change in the range of lake habitat 3110.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Routine Water Framework Directive monitoring by the Irish EPA of lake macrophytes at more than 220 lakes has significantly increased the available data on Irish lake habitats. In addition, this assessment made greater use of older studies on lake vegetation (e.g. Visser and Zoer, 1972, 1976, Heuff, 1984, Roden, 1999, Free et al., 2006, 2009).
2.3.10 c) Reason for change - use of different method	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of a different approach to mapping the distribution of the habitat and the new range tool. The main reason for the change in the range was the different approach taken to mapping the habitat's distribution. This is described in sections 1.1.2 and 2.3.9 d) above, and in greater detail in O Connor (2013b). The principal differences were the removal of non-lake habitats from the distribution, the incorporation of additional biological data and the separation of habitats 3130 and 3150. Many lakes containing habitats 3140 and/or 3150 were misclassified as having 3110/3130 in 2007, while lakes with 3110 and/or 3130 were frequently misclassified as 3140. The recommended Range Tool was used and this has been demonstrated to produce a significantly larger range to method of range mapping used in 2007 (see O Connor, 2013a).

Field label	Note
Habitat code: 3110	
2.4.01 Surface area	407.1 km2. The surface area of the habitat was based on the surface area of the lakes containing the habitat. A two-step process was adopted. Firstly, the area of all 1,276 lake segments identified as containing habitat 3110 was summed (see 1.1.2 and O Connor (2013b) for further information on 3110 lake distribution). The summed lake surface areas came to 37,733.78 ha or 377.3 km2. Secondly, it was assumed that some of the 5,463 lake segments that were not examined also contain habitat 3110. Owing to the significant number of errors identified in the national dataset, a correction factor was generated (see O Connor, 2013b for further information on errors). This was based on the percentage area of lake segments examined to which no lake habitat was assigned. The total area of the 476 unassigned polygons was 7,646 ha. This represents 6.3% of the total area (121,971 ha) of the 6,669 polygons examined. The total area of the 5,463 lake segments that were not examined was 96.5 km2. This was reduced by 6.3% to 90.4 km2, to take account of the errors in the dataset. The total area of the 6,193 lake segments to which one or more of the lake habitats was assigned was 1,143.2 km2. 377.3 km2 or 33% of this area was assigned to 3110. 33% of 90.4 km2 is 29.8 km2. The two figures (377.3 km2 and 29.8 km2) were summed to give 407.1 km2. As some lakes can contain more than one Annex I lake habitat (habitat 3110 co-occurs with habitats 3130, 3160 and at a limited number of large lakes, with 3140), this figure is an overestimate of the actual area of the habitat. Even where habitat 3110 is the only lake habitat occurring, it very seldom covers an area equivalent to the surface area of the lake. Accurate mapping of submerged macrophyte communities is challenging and time-consuming, so that lake surface area is likely to remain the only available indicator of habitat area into the future.
2.4.02 Year or period	The surface area was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.4.12 a) Favourable reference area - In km2	407.1 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 33% of the total area estimated to have lake habitats (3110, 3130, 3140, 3150, 3160), it can be assumed that the current area is large enough to allow the long-term survival of the habitat. As a result, the surface area is set as the Favourable Reference Area. As with Range, area is likely to be an insensitive measure for the conservation status of lake habitats. It is unlikely that any significant increases or decreases in lake surface area will occur in Ireland and, hence, the conservation status of both area and range will remain favourable. As noted in 2.3.9 d), habitat quality (structures and functions) is the key measure of the conservation status of lake habitats.
2.4.13 a) Reason for change - genuine change?	There has been no genuine change in the area of lake habitat 3110.

Field label	Note
Habitat code: 3110	
2.4.13 b) Reason for change - improved knowledge/more accurate data?	See 2.3.10 b) which describes the improved knowledge used in this assessment.
2.4.13 c) Reason for change - use of different method	The main reason for the change in the area of 3110 was the different approach taken to mapping the habitat's distribution. This is described in section 1.1.2 and 2.3.10 c) above and in greater detail in O Connor (2013b).

Field label	Note
Habitat code: 3110	
2.5 Main pressures	The pressures impacting on habitat 3110 are indirect, arising within the catchments of the occupied lakes, and can be broadly categorised into pollution and hydrological change. Direct impacts on the habitat have not been documented in Ireland, however, it is possible that some invasive species are having direct impacts. The main threats to isoetid lakes across Europe come from eutrophication, acidification and alkalisation, water level changes, habitat destruction, peat erosion and invasive alien species (Free et al., 2009). Conifer plantations on peatland, leading to increased water colour and nutrient loads or lower pH are a significant concern (Free et al., 2009). Information on pressures on general water quality, and expert judgement were used to determine the pressures on lake habitat 3110. The main information sources were: 1. Water Framework Directive Reports (River Basin Management Plans, associated Water Management Unit Action Plans (http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%20 2009%20-%202015/) and the 2005 Article 5 Report (http://www.wfdireland.net/wfd-charreport.html)). 2. National Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, EPA, 2008, http://testweb.epa.ie/irelandsenvironment/). The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on habitat 3110. The pressures identified, listed in an approximate order of importance, were: 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H01.09, diffuse pollution to surface waters due to other sources not listed, High importance (predominately peatland drainage and degradation) 3. J02.07, Water abstractions from groundwater, High importance (peatland drainage) 4. C01.03.02 X, mechanical removal of peat, High importance 5. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, High importance 6. H01.01, pollution to surface waters by industrial plants, Medium importance 7. H01.02, pollution to surface waters by storm overflows, Medium importance 8. H01.03, other point source pollution to surface water, Low importance 9. J02.06.02, surface water abstractions for public water supply, Low importance 10. I01, invasive non-native species, Low importance 11. J02, human induced changes in hydraulic conditions, Low importance Codes H01.09 and J02.07 were used to indicate pollution and hydrological pressures arising from land drainage in the lake's catchment. Other codes could have been used, e.g. J02.05 'Modification of hydrographic functioning, general. Areas of wetland and other terrestrial habitats are frequently drained in Ireland for purposes such as development, agriculture, forestry and peat-cutting. Pollution qualifiers were not used, with the exception of C01.03.02. Most of the pressures listed result in increased nutrient loads and eutrophication. Hydrological change, increased sediment loads (leading to sedimentation and turbidity), increased organic carbon loads, increased water colour and acidification are other likely impacts. Zebra mussels were recorded at three of the 57 monitored lakes. Further information on how these pressures can impact on habitat 3110 is given in the backing document (O Connor, 2013b).

Field label	Note
Habitat code: 3110	
2.5.01 Method used - pressures	Information on pressures on general water quality and expert judgement were used to determine the pressures on lake habitat 3110. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.6 Main threats	All pressures documented at 2.5 were also listed as threats. In addition, climate change was identified as a threat. Free et al. (2009) noted that climate change could affect isoetid communities either through increased CO_2 concentrations or by altering catchment processes (e.g. increased export of humic substances). 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H01.09, diffuse pollution to surface waters due to other sources not listed, High importance 3. J02.07, Water abstractions from groundwater, High importance 4. C01.03.02 X, mechanical removal of peat, High importance 5. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, High importance 6. H01.01, pollution to surface waters by industrial plants, Medium importance 7. H01.02, pollution to surface waters by storm overflows, Medium importance 8. M01, Changes in abiotic conditions, Medium importance 9. H01.03, other point source pollution to surface water, Low importance 10. J02.06.02, surface water abstractions for public water supply, Low importance 11. I01, invasive non-native species, Low importance 12. J02, human induced changes in hydraulic conditions, Low importance
2.6.01 Method used - Threats	Information on pressures on general water quality and expert judgement were used to determine the threats on lake habitat 3110. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.7 Complementary information	The interpretation manual of EU habitats lists plant species associated with habitat 3110 (CEC, 2007). This list was reviewed against available publications on lake macrophyte communities in Ireland (Visser and Zoer, 1972, 1976, Heuff, 1984, Free et al., 2006, 2009) and Great Britain (Palmer 1989, 1992, Palmer et al., 1992, Duigan et al., 2006), as well as publications on aquatic macrophyte species (Preston, 1995, Preston and Croft, 2001) and EPA macrophyte raw data from routine Water Framework Directive monitoring (2001-2012). This review produced thefinal list of typical species.

Habitat code: 3110

Field label	Note
2.7.04 Structure and functions - Methods used	2 = Estimate based on partial data with some extrapolation and/or modelling No dedicated monitoring programme exists for lake habitat 3110 in Ireland and a standard method for assessing its conservation condition at individual sites has not yet been developed. Fortunately, however, significant quantities of data on the general environmental and ecological status of Irish lakes are available. The Irish EPA is responsible for co-ordinating the Water Framework Directive (WFD) monitoring programme, for monitoring the lake biological quality elements (other than fish, which are monitored by Inland Fisheries Ireland) and for reporting on ecological status. The lake monitoring programme follows a three-year-cycle. EPA lake ecological status data for the years 2009-2011 inclusive were used to assess the quality of habitat 3110. 2009-2011 ecological status data were available for 57 or 4.5 % of the 1,276 lakes mapped as having habitat 3110. Most of the lake indicators developed for WFD purposes (known as 'metrics' for the 'quality elements' specified in Annex V of the WFD) assess eutrophication impacts, notably: 1. Chlorophyll a status 2. Nutrient condition status 3. Macrophyte status 4. Phytobenthos status 5. Phytoplankton composition status These quality elements, as well as acidification/alkalisation, were used to assess the conservation condition of the structures and functions of the 57 monitored lakes with habitat 3110. Final ecological status (2009-2011) was not used as it incorporates fish status and it is unlikely there is a correlation between fish status and the status of habitat 3110. Final ecological status also incorporates information on the occurrence of alien invasive species (zebra mussels and roach). Alien invasive species are here considered potential pressures to habitat 3110. Their presence alone is not, however, considered sufficient to warrant a change in structure and functions condition from good to poor. As for other pressures, such as eutrophication and acidification, any impact of alien invasive species should be detected through appropriate biological and physico-chemical monitoring. As the habitat by definition requires oligotrophic conditions, the target for each of the five eutrophication indicators listed above is high status. This is because WFD high status reflects oligotrophic conditions (as defined by the standard OECD approach incorporating data on chlorophyll a and total phosphorus concentrations), while WFD good status reflects mesotrophic conditions. Consequently, WFD 'good' status is considered equivalent to poor conservation condition, while moderate, poor or bad status is considered equivalent to bad conservation condition. Similarly, the target for acidification/alkalisation status is high. For the structure and functions to be considered to be in favourable condition, all six elements must be at high status. This use of the lowest common denominator of the six quality elements is in keeping with final ecological status classification under the WFD, which is derived by taking the lowest status classes for the full range of specified biological, physico-chemical and hydromorphological quality elements (Tierney, et al. 2010). WFD status for the monitored lakes with 3110 for the period 2009-2011 converted here to Habitat Directive terms "good", "poor" or "bad" was as follows: 1. Chlorophyll a status – 75% of the 56 monitored lakes in good condition (high status), 18% at poor and 7% at bad. 2. Nutrient condition status – 67% of the 57 monitored lakes in good condition, 28% in poor and 5% in bad. 3. Macrophyte status – 59% of the 56 monitored lakes in good condition, 27% at poor and 14% at bad.

Habitat code: 3110

Field label	Note
	4. Phytobenthos status – 70% of the 23 monitored lakes in good condition, 30% in poor and 0% in bad. 5. Phytoplankton composition status – 86% of the 21 monitored lakes in good condition, 14% in poor and 0% in bad. 6. Acidification/alkalisation status – 98% of 53 monitored lakes in good condition, 2% in bad. 7. Final conservation condition – 38% or 22 of the 57 monitored lakes were in good condition, 37% or 21 lakes were in poor condition and 25% or 14 lakes were in bad condition. It is worthy of note that had the Final ecological status (2009-2011) been used, only 24% of the lakes would have reached good condition, 48% poor and 28% bad. Eutrophication is the most likely impact in lakes with 3110, so the EPA ecological status data are a very important indicator of the condition of the habitat at individual sites. It is possible, however, that the metrics are not sensitive to other impacts that are likely to occur in these lakes, given the pressures documented in their catchments. These other impacts include increased turbidity, sedimentation, increased dissolved and particulate organic carbon loads, hydrological changes and acidification. Given that 37% of monitored lakes were in poor condition and 25% were in bad condition, the national status of the structure and functions of habitat 3110 was assessed as bad.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the habitat is concentrated in the western third of the country and uplands and shows a distinct association with peatland areas. 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 terrestrial grid, the range is considered to be favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The estimated area of the habitat is 407.1 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 33% of the total area with lake habitats (3110, 3130, 3140, 3150, 3160), the area is considered to be favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although there has been no dedicated monitoring of habitat 3110 during the period, detailed biological and physico-chemical data are available for 57 (or 4.5%) of lakes with 3110. Given that 37% of the monitored lakes were in poor condition and 25% were in bad condition, the national status of the structure and functions of habitat 3110 was assessed as bad.

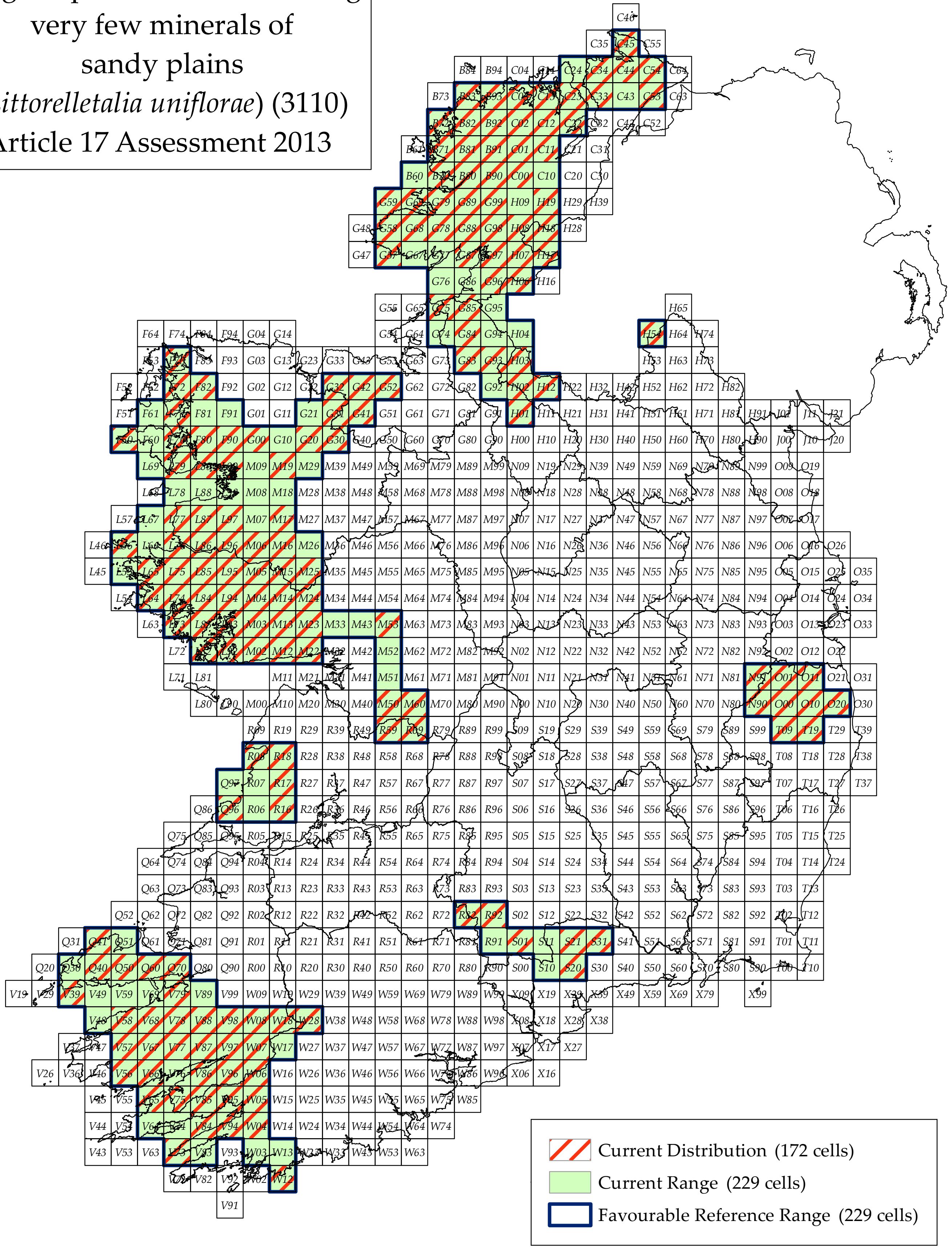
Field label	Note
Habitat code: 3110	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Tierney et al. (2010) illustrated the long-term trend in trophic status in Irish lakes, expressed in accordance with the areas of monitored lakes. The authors stated that 'the percentage of lake area in each trophic category has remained relatively stable since 1998, based on the modified OECD scheme' suggesting that the short-term trend in lake habitat quality generally is stable. This analysis, however, combines oligotrophic and mesotrophic categories so that trends in oligotrophic lakes cannot be determined. Consequently, It is not possible to determine how representative this general lake trend is of the 3110 lake habitat. The EPA and local authorities have examined and reported on chlorophyll a in twenty-two lakes continuously in each three-year water quality review period since 1976, and a further five lakes have continuous data since 1982. This dataset was examined for general chlorophyll a trends in oligotrophic and mesotrophic lakes (see Najas flexilis backing document for further information, O Connor, 2013a). While no clear trend emerged for the 14 lakes examined, the overall impression was of stable or even decreasing chlorophyll a concentrations. A rise in chlorophyll a concentration was suggested in three lakes. The presence of zebra mussels in eight of the 14 lakes, however, may have masked increases in productivity. Ní Chatháin et al. (2013) examined trends in high status water bodies over time. They stated that significant declines in lake quality may have occurred but were uncertain, owing to the sporadic nature of lake monitoring and the focus on lakes with water quality problems before the WFD monitoring programme began. The significant declines in high status rivers, however, give rise to concern. The decline in river water quality is overwhelmingly related to enrichment. An increase in nutrient loads to rivers that results in deterioration of river biological quality is likely to have a proportionately greater impact on downstream lakes, because of the rapid cycling and movement of nutrients through river systems and the significantly longer retention time in lakes. Ní Chatháin et al. (2013) documented a steady decline in monitored high status river sites from 41% in 1998-2000, to 37% in 2001-2003, 31% in 2004-2006, and 27% in 2007-2009. Even allowing for a reduction in the number of river sites monitored, this represented a loss of 280 high status sites between 1998 and 2009 (this is an adjusted figure - the actual reduction in the number of sites achieving Q5/Q4-5 was 369) (Ní Chatháin et al., 2013). Of particular concern for habitat 3110 were the significant losses of high status river sites in counties with a high density of lakes with that habitat, particularly Donegal (79 high status river sites lost), Mayo (33), Kerry (22), Wicklow (19) and Galway (14). Status was based on macroinvertebrate monitoring and included both Q5 and Q4-5 sites (Ní Chatháin et al., 2013). Only 41 of the 407 river sites classified as at high status for the 2007-2009 monitoring period were at Q5 (366 at Q4-5), again indicative of the deterioration in the highest quality river sites (Ní Chatháin et al., 2013). On balance and given that habitat 3110 requires oligotrophic conditions the status of the structure and functions of habitat 3110 is assumed to be declining.

Field label	Note
Habitat code: 3110	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. A number of important WFD measures are likely to contribute to the protection of and improvements in lakes with 3110, particularly the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS), national investment in municipal wastewater treatment and regulation of such discharges by the EPA. These measures should, with time, lead to reductions in pollutant losses from individual houses and municipal wastewaters. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. It must be recognised, however, that a very large number of DWWTS need to be inspected nationally and that this will take a significant amount of time. The current RBMP measures are likely to be insufficient to protect habitat 3110, however, for a number of reasons, most notably: 1. An objective of good status applies to all lakes not currently at high status (76% of monitored 3110 lakes, see 'final ecological status' 2.7.4) and this will not allow for restoration of the habitat. 2. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status in areas of Ireland with high rainfall and/or organic soils. Given that the majority of phosphorus lost to surface waters has an agricultural origin, this is a significant concern and means that the current measures may not even succeed in preventing further deterioration of lake water quality. 3. There are currently no measures to address the impacts of drainage on surface waters. It is assumed, therefore, that current and future RBMP cycles will lead to a gradual reduction in pressures from DWWTS and municipal wastewaters. Unless an objective of high status is established for lakes with habitat 3110, however, the standards applied to such wastewaters may not be sufficiently stringent. It is likely that maintenance or restoration of habitat 3110 would require dedicated Sub-basin Management Plans with more stringent objectives and specific measures to address catchment-specific pressures, particularly diffuse pollution from agriculture, forestry and peat-cutting, and hydrological and acidification pressures associated with peatland drainage. Agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and current agricultural policy supports food production and land intensification. Conservation actions to rehabilitate and restore blanket bogs (Reasoned opinion 2010/2161) and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some 3110 catchments. However, economic pressures may be increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural reclamation of peat and peaty soils is ongoing in the west, in particular. These considerations combined with the current status of the habitat's structure and functions, on going pressures and the threats posed by climate change mean

	that the future prospects are considered bad.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	See 2.8.4 a). It would appear overall that without dedicated conservation programmes for the habitat, the pressures on habitat 3110 will most likely increase in the future.
2.8.05 Overall assessment of Conservation Status	The main problems for lake habitats in Ireland are damage through eutrophication and other processes linked to water pollution and hydrological change, rather than habitat loss and destruction. Consequently, the conservation status of the range and area of habitat 3110 were assessed as favourable. No dedicated surveillance of habitat 3110 has been conducted and WFD water quality data were used to assess the status of the habitat's structure and functions. An expert judgement led review of the data for 57 lakes with habitat 3110 concluded that structure and functions are currently bad and declining. The pressures and threats on habitat 3110 are indirect, arising within the catchments of the occupied lakes. Agriculture, forestry and other activities on peatland are the most significant pressures and threats for habitat 3110. While significant measures are being implemented to address pollution from domestic wastewater systems, action to reduce losses from agriculture, the largest source of phosphorus to water, is considered inadequate and there are currently no measures to address the impacts of peatland drainage and general degradation. As a result, the future prospects for the habitat were also considered bad, declining. The overall conservation status of lake habitat 3150 is assessed as unfavourable bad, declining.
2.8.06 Overall trend in Conservation Status	The overall trend is considered to be declining, given the status of the structure and functions and the prediction that pressures are most likely to increase on the habitat in the future.
3.1.02 Method used	70.1 km2 The shapefile of lakes with habitat 3110 was intersected with the shapefile of the SAC networ and all lakes occurring within the network selected. 671 of the 1,276 lakes assigned habitat 3110 were within the network. These totalled 65.8 km2 in area. In addition, a shapefile was created of the 5,463 lake segments not examined during the lake habitat assessments (2007-2012). This shapefile was intersected with the SAC network and 791 unexamined lakes with a total area of 13.9 km2 found within the network. Using the same correction factor (- 6.3%) and percentage area of lakes with habitat 3110 (33%) used in 2.4.1, the additional area of habitat 3110 within the network was estimated as 4.3 km2. Summing these two figures (65.8 km2 and 4.3 km2) gave a total area of 70.1 km2 of habitat 3110 within the network. The same method was used to estimate the area of the habitat within SAC selected for its protection (figure given in 2.7.5). 530 lakes with habitat 3110 totalling 5,720.2 ha or 57.2 km2 in area were found within the 32 SAC selected for the habitat. 423 unexamined segment, totalling 7.7 km2 were found within the 32 SAC. Therefore, 2.4 km2 of habitat 3110 was estimated to occur within the 32 SAC from the unexamined segments, bringing the total to 57.2 km2 plus 2.4 km2 or 59.6 km2.
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.

Field label	Note
Habitat code: 3110	
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for habitat 3110 in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. There are, however, no conservation measures currently being undertaken to restore or enhance areas of 3110 habitat within SAC. More detailed surveillance of the habitat would be required before such measures could be planned. The Programmes of Measures (Measure 4.1) under the WFD River Basin Management Plans will help improve water quality generally, however, their focus is on improvement of poor quality rather than maintenance or restoration of the highest quality.

Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110) Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3130

NAME: Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Na

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	26100	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	26100
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. This is smaller than the FRR set in 2007 (65,100 km2) owing to the improved method of mapping the habitat's distribution. The main reasons for the reduction were: 1. a better understanding of the habitat, 2. the separation of habitats 3110 and 3130, which were not distinguished in 2007, 3. the mapping of natural eutrophic lake habitat (3150), which was not mapped in 2007, 4. the removal of turloughs, lagoons and other non-lake segments, and 5. the removal of lake segments of less than one hectare in area unless site-specific information identified the presence of the habitat in the small lake/pond. It should be noted that Range is likely to be an insensitive measure for the conservation status of lake habitats. Lakes can be 'created' by the damming of rivers and while their area can be reduced through drainage or processes of natural succession, they are unlikely to be destroyed. In a temperate, oceanic climate such as that of Ireland, it is unlikely that the range of habitat 3130 will ever change. The quality of the habitat (structures and functions) may deteriorate significantly and this is the key measure of the conservation status of the habitat. It is assumed throughout this assessment that restoration of habitat 3130 is possible regardless of the severity of the deterioration in habitat quality.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	558.4		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		

2.4.8 Long-term trend period	1989-2012		
2.4.9 Long-term trend direction	stable (0)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		

2.4.12 Favourable reference area	area (km)	558.4
	operator	N/A
	unknown	No
	method	The current surface area was derived by summing the lake surface areas and is considered to be the FRA, as there is no evidence of a decline since the Directive came into force. This is smaller than the FRA set in 2007 (678 km2) owing to the different method of mapping the habitat's distribution. The main reasons for the reduction were the separation of habitats 3110 and 3130, which were not distinguished in 2007, the removal of lake segments of less than one hectare in area, and the improved knowledge of the distribution of the natural eutrophic lake habitat (3150), which was not mapped in 2007.

2.4.13 Reason for change

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A
Silting up (K01.02)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
accumulation of organic material (K02.02)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A

diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
Silting up (K01.02)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
accumulation of organic material (K02.02)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Apium inundatum

Callitriche hermaphroditica

Chara aspera

Chara virgata

Elatine hexandra

Eriocaulon aquaticum

Fontinalis antipyretica

Hydrilla verticillata

Isoetes echinospora

Isoetes lacustris

Juncus bulbosus

Littorella uniflora

Lobelia dortmanna

Myriophyllum alterniflorum

Nitella confervacea

Najas flexilis

Nitella flexilis

Nitella translucens

Pilularia globulifera

Potamogeton berchtoldii

Potamogeton gramineus

Potamogeton natans

Potamogeton obtusifolius

Potamogeton perfoliatus

Sparganium angustifolium

Utricularia sp.

2.7.2 Species method used	The Najas flexilis conservation assessment (unfavourable inadequate, see O Connor (2013a), expert judgement and the EPA macrophyte raw data from routine Water Framework Directive monitoring (2007-2012) were used to asses the status of typical species as part of the overall assessment of the structure and functions.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Range and Area are likely to be insensitive measures for the conservation status of lake habitats and are unlikely to change significantly between reporting periods. The quality of the habitat (structures and functions) is the key measure of the current conservation status of the habitat. The structure and functions assessment, combined with information on pressures and their associated drivers, determine the future prospects assessment. An estimated 7.1 km2 of lake area was considered to have habitat 3130 within the nine SAC where habitat 3130 is a qualifying interest for the site. The habitat is considered not to be present in three of the nine SAC designated for its protection. This anomaly is the result of the EU interpretation of habitats 3110 and 3130 available at the time of the selection of Irish lake habitat SAC. In the EU interpretation manual (Version 12 of 1995), habitat 3130 was named “oligotrophic waters in medio-European and perialpine area with amphibious vegetation: Littorella or Isoetes or annual vegetation on exposed banks (Nanocyperetalia)” and the description was “Oligotrophic to mesotrophic standing waters of plains to subalpine levels of the Continental and Alpine Region and mountain areas of other regions . .” The interpretation used by the NPWS at the time was, therefore, to designate upland, predominately corrie lakes as SAC for habitat 3130 as Ireland is within the Atlantic Region. The reference to ‘mountain areas’ was removed from subsequent versions of the manual. The anomalies can readily be addressed by selection of the SAC for 3110, rather than 3130.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Favourable (FV) qualifiers N/A
2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	31.8	max	31.8
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Outside	Enhance Long term

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 3130	
0.2 Habitat code	Habitat 3130, Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) occurs in lakes with circum-neutral waters in catchments with mixed geology. Peatland is often widespread in the catchments, with base-rich influences coming from basalt, limestone, marble, sedimentary deposits or calcareous coastal sand. The Annex II macrophyte Najas flexilis is a character species of this habitat. The co-occurrence of Potamogeton perfoliatus and Isoetes lacustris is also characteristic. Ireland is a stronghold for the habitat, where it is widespread particularly along the western fringe. The habitat is under significant pressure from eutrophication, peatland drainage and, to a lesser extent, acidification.
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

Field label	Note
Habitat code: 3130	
1.1.02 Method used - map	The distribution of habitat 3130 in Ireland was based on mapped lakes. The "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 12,217 separate polygons. A number of rules were applied during the process of assigning habitat 3130 to these polygons, in summary: 1. Polygons for the priority habitat coastal lagoons (habitat code 1150) were removed from the dataset. 2. Habitat 3130 was not assigned to any segments of less than 1 ha in area unless site-specific data or knowledge existed to demonstrate its presence. Lake habitats do not generally develop in waterbodies of less than 6 ha, so the 1 ha rule may overestimate the area of habitat 3130 in Ireland. 3. Habitat 3130 was not assigned to any turlough polygons (priority habitat 3180). 4. Habitat 3130 was assigned to lakes that also contain habitats 3110 (Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)), 3150 (Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation) and 3140 (Hard oligo-mesotrophic waters with benthic vegetation of Chara spp). 5. All lakes with extant populations of Najas flexilis (n = 58) and those from which the species is known to have gone extinct before the Directive came into force (n = 3) were assigned habitat 3130. 6. EPA data on aquatic macrophytes were also used to identify lakes with habitat 3130, particularly the co-occurrence of Potamogeton perfoliatus and Isoetes lacustris. 7. Geological data, topography, altitude (low-lying lakes only, < 200 m)), physico-chemical data, satellite imagery and orthophotography were used, in combination with expert judgement, to identify lakes with 3130 for which no macrophyte data were available. Confidence is low in the classification of lakes using expert judgement. 8. The full distribution of habitat 3130 was reviewed and corrections made as necessary. The full distribution mapping process is detailed in Appendix II of the lake habitat backing document (O Connor, 2013b). This process resulted in a map of the lakes in which habitat 3130 occurs. Of the 3,719 lakes with an area of greater than 1 ha in the national dataset, 2,505 were examined and 417 were classified as having habitat 3130. No lakes of less than 1 ha in area were classified as having the habitat. The distribution of the habitat was based on these 417 lake segments. The 417 lake segments with habitat 3130 were intersected with the Irish National 10 km Grid, producing a distribution of 179 10 km squares. The habitat was distributed across 417 lakes in 16 counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Louth, Mayo, Meath, Monaghan, Roscommon, Sligo, Waterford, Wexford and Wicklow). It must be stated that habitat 3130 was assigned to the majority of the 417 lakes using geological and other mapping data. The confidence in the distribution is, as a result, low. This is particularly true of areas of the southeast (Waterford, Wexford) and drumlin belt (Monaghan, Cavan, Leitrim). Field survey is necessary to confirm the habitat's distribution and to improve understanding of its natural, ecological variation and the impacts that result from anthropogenic pressures. The rules adopted for distribution mapping differed from those used in 2007 in a number of respects, most significantly in that, in 2007: 1. Only one lake habitat was assigned to each lake, 2. A lake habitat was assigned to 11,924 WFD lake polygons from the 2007 dataset, including ponds of < 1 ha in area, coastal lagoons and turloughs. For this assessment (2013), lake habitats were assigned only to segments that were

Field label	Note
Habitat code: 3130	
	examined as detailed above. Lake habitat were not assigned to 476 segments (or 7.1% of the polygons examined, by number) because they were found to be turloughs, lagoons, artificial ornamental ponds, mill ponds, reservoirs, fens, bogs, quarry ponds, mine tailings or other (often non-wetland) features. 3. Lake habitats 3110 and 3130 were not distinguished and 7,728 lake polygons were assigned to the combined category "3110/3130", 4. No lake polygons were classified as having lake habitat 3150.
1.1.03 Year or period	The distribution was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs. Macrophyte data used were of various ages, but principally dated from the period 2001-2012.
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps using the recommended Range Tool.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressure and threats.
2.3.02 Method used - Range	See 1.1.2, 1.1.4 and 1.1.5 above, and O Connor (2013b) for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.09 a) Favourable reference range - In km2	17,900 km2. As there is no evidence of a decline in range since the Directive came into force, the area of the range is large at approximately 21% of the terrestrial grid and the habitat is widespread (covering 16 counties), it can be assumed that the current range is large enough to allow the long-term survival of the habitat. As a result, the current range is set as the Favourable Reference Range. This FRR represents an improvement on that reported in 2007, in which habitat 3130 was not separated from habitat 3110.
2.3.10 a) Reason for change - genuine change?	There has been no genuine change in the range of lake habitat 3130.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	A re-interpretation of the habitat, using available data and reports for Ireland and Great Britain, has improved the knowledge of its distribution (see O Connor (2013b) for further information). Improved knowledge and more accurate data on the distribution of Najas flexilis have increased the distribution of habitat 3130 (see O Connor 2013a). Routine Water Framework Directive monitoring by the Irish EPA of lake macrophytes at more than 220 lakes has significantly increased the available data on Irish lake habitats. In addition, this assessment made greater use of older studies on lake vegetation (e.g. van Groenendael et al., 1979, Heuff, 1984, FitzGerald and Preston, 1994, Roden, 1999, 2004).

Field label	Note
Habitat code: 3130	
2.3.10 c) Reason for change - use of different method	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of a different approach to mapping the distribution of the habitat and the new range tool. The main reason for the change in the range was the different approach taken to mapping the habitat's distribution. This is described in sections 1.1.2 and 2.3.9 d) above, and in greater detail in O Connor (2013b). The principal differences were the removal of non-lake habitats from the distribution, the incorporation of additional biological data and the separation of habitats 3130 and 3110. Many lakes containing habitats 3140 and/or 3150 were misclassified as having 3110/3130 in 2007, while lakes with 3110 and/or 3130 were frequently misclassified as 3140. The recommended Range Tool was used and this has been demonstrated to produce a significantly larger range to method of range mapping used in 2007 (see O Connor, 2013a).
2.4.01 Surface area	558.4 km2. The surface area of the habitat was based on the surface area of the lakes containing the habitat. A two-step process was adopted. Firstly, the area of all 417 lake segments identified as containing habitat 3130 was summed (see 1.1.2 and O Connor (2013b) for further information on 3130 lake distribution). The "HECTARE" field in which came from the original WFD_LakeSegment feature data class in the WFDGeodatabase.mdb Ver Oct 2011, was used. The summed lake surface areas came to 52,158.77ha or 521.6 km2. Secondly, it was assumed that some of the 5,463 lake segments that were not examined also contain habitat 3130. Based on the distribution findings detailed in 1.1.2, where no lakes of less than 1 ha in area were found to have habitat 3130, it was assumed that none of the 5,463 lake segments of <1 ha had the habitat. This reduced the number of unexamined lake segments to 1,214. Owing to the significant number of errors identified in the national dataset, a correction factor was applied (see O Connor, 2013b for further information on errors). This was based on the percentage area of lake segments > 1 ha examined to which no lake habitat was assigned. The total area of the 284 unassigned polygons > 1 ha was 7,576.97 ha. This represents 6.3% of the total area (120,987.9 ha) of the 2,505 polygons examined > 1 ha. The total area of the 1,214 lake segments >1 ha that were not examined was 85.4 km2. This was reduced by 6.3% to 80 km2, to take account of the errors in the dataset. The total area of the 2,221 lake segments > 1 ha to which one or more of the lake habitats was assigned was 1,134.1 km2. 521.6 km2 or 46% of this area was assigned to 3130. 46% of 80 km2 is 36.8 km2. The two figures (521.6 km2 and 36.8 km2) were summed to give 558.4 km2. As some lakes can contain more than one Annex I lake habitat (habitat 3130 co-occurs with habitats 3110, 3140 and 3150), this figure is a significant overestimate of the actual area of the habitat. Even where habitat 3130 is the only lake habitat occurring, it very seldom covers an area equivalent to the surface area of the lake. Accurate mapping of submerged macrophyte communities is challenging and time-consuming, so that lake surface area is likely to remain the only available indicator of habitat area into the future.
2.4.02 Year or period	The surface area was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.

Field label	Note
Habitat code: 3130	
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.4.12 a) Favourable reference area - In km2	558.4 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 46% of the total area of waterbodies > 1ha with lake habitats (3110, 3130, 3140, 3150, 3160), it can be assumed that the current area is large enough to allow the long-term survival of the habitat. As a result, the surface area is set as the Favourable Reference Area. As with Range, area is likely to be an insensitive measure for the conservation status of lake habitats. It is unlikely that any significant increases or decreases in lake surface area will occur in Ireland and, hence, the conservation status of both area and range will remain favourable. Habitat quality (structures and functions) is, therefore, the key measure of the conservation status of lake habitats.
2.4.13 a) Reason for change - genuine change?	There has been no genuine change in the area of lake habitat 3130.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	See 2.3.10 b) which describes the improved knowledge used in this assessment.
2.4.13 c) Reason for change - use of different method	The main reason for the change in the area of 3130 was the different approach taken to mapping the habitat's distribution. This is described in section 1.1.2 and 2.3.10 c) above and in greater detail in O Connor (2013b).

Field label	Note
Habitat code: 3130	
2.5 Main pressures	The pressures impacting on habitat 3130 are indirect, arising within the catchments of the occupied lakes, and can be broadly categorised into pollution and hydrological change. Direct impacts on the habitat have not been documented in Ireland, however, it is possible that some invasive species are having direct impacts. The main threats to lakes with habitat 3130 come from eutrophication, acidification and peatland damage. Information on pressures on Najas flexilis habitat, general water quality, and expert judgement were used to determine the pressures on lake habitat 3130. The main information sources were: 1. Dedicated survey of Najas flexilis between 1999 and 2005, in the main (see O Connor, 2013a). 2. Examination of the catchments of Najas flexilis lakes (O Connor, 2013a). 3. Water Framework Directive Reports (River Basin Management Plans, associated Water Management Unit Action Plans (http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%20 2009%20-%202015/) and the 2005 Article 5 Report (http://www.wfdireland.net/wfd-charreport.html)). 4. National Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, EPA, 2008, http://testweb.epa.ie/irelandsenvironment/). The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on habitat 3110. The pressures identified, listed in an approximate order of importance, were: 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, High importance 3. H01.09, diffuse pollution to surface waters due to other sources not listed*, High importance (peatland drainage and degradation, in the main) 4. J02.07, Water abstractions from groundwater *, High importance (peatland drainage) 5. C01.03.02 X, mechanical removal of peat, High importance 6. H01.01, pollution to surface waters by industrial plants, Medium importance 7. H01.03, other point source pollution to surface water, Low importance 8. I01, invasive non-native species, Low importance 9. J02, human induced changes in hydraulic conditions, Low importance 10. K01.02, silting up, Low importance 11. K01.03, drying out, Low importance 12. K02.01, species composition change (succession), Low importance 13. K02.02, accumulation of organic material, Low importance Codes H01.09 and J02.07 were used to indicate pollution and hydrological pressures arising from land drainage in the lake's catchment. Other codes could have been used, e.g. J02.05 'Modification of hydrographic functioning, general. Areas of wetland and other terrestrial habitats are frequently drained in Ireland for purposes such as development, agriculture, forestry and peat-cutting. Pollution qualifiers were not used, with the exception of C01.03.02. Most of the pressures listed result in increased nutrient loads and eutrophication. Hydrological change, increased sediment loads (leading to sedimentation and turbidity), increased organic carbon loads, increased water colour and acidification are other likely impacts. Zebra mussels were recorded at 14 of the 93 monitored lakes. K01 and K02 pressures were recorded at a small number of coastal Najas flexilis lakes (O Connor, 2013a). Further information on how these pressures can impact on habitat 3130 is given in O Connor (2013 a and b).

Field label	Note
Habitat code: 3130	
2.5.01 Method used - pressures	Information on pressures on Najas flexilis, general water quality and expert judgement were used to determine the pressures on lake habitat 3130. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.6 Main threats	All pressures documented at 2.5 were also listed as threats. In addition, climate change was identified as a threat. The potential impacts of climate change on lake habitat 3130 are described in O Connor (2013 a and b). 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, High importance 3. H01.09, diffuse pollution to surface waters due to other sources not listed*, High importance 4. J02.07, Water abstractions from groundwater *, High importance 5. C01.03.02 X, mechanical removal of peat, High importance 6. H01.01, pollution to surface waters by industrial plants, Medium importance 7. M01, Changes in abiotic conditions, Medium importance 8. H01.03, other point source pollution to surface water, Low importance 9. I01, invasive non-native species, Low importance 10. J02, human induced changes in hydraulic conditions, Low importance 11. K01.02, silting up, Low importance 12. K01.03, drying out, Low importance 13. K02.01, species composition change (succession), Low importance 14. K02.02, accumulation of organic material, Low importance
2.6.01 Method used - Threats	Information on pressures on Najas flexilis, general water quality and expert judgement were used to determine the threats on lake habitat 3130. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.7 Complementary information	For the purposes of this assessment, Najas flexilis is considered a characteristic species of 3130 lakes. Consequently, information on the species associated with Najas flexilis has been used to develop the typical species list. Roden (2004) noted the frequent co-occurrence of Potamogeton perfoliatus and Isoetes lacustris in Najas flexilis lakes, which is indicative of the mixed geological conditions favoured by the latter species. Roden (2004) described two groups of associated species; the first group included Callitriche hermaphroditica, several Chara species and broad-leaved pondweeds (Potamogeton spp.). A similar list of associated species was noted by Preston and Croft (2001). The second group of associated species identified included Elatine hexandra and Nitella translucens (Roden, 2004). Roden (2004) noted that other local or rare species were encountered in the Elatine hexandra and Nitella translucens group, including Pilularia globulifera, Isoetes echinospora and Potamogeton obtusifolius. Another rare macrophyte associated with Najas flexilis lakes is Hydrilla verticillata. Roden (2007) noted that Eriocaulon aquaticum also frequently occurs in Najas lakes. The final list of typical species for habitat 3130, based on Roden (2002, 2004, 2007), cross-checked with Heuff (1984), Palmer (1989, 1992), Palmer et al. (1992), Preston and Croft (2001) and Duigan et al. 2006, 2007). Other Potamogeton species can also occur, and the habitat may be linked with another rare macrophyte, Luronium natans. For further information on Najas flexilis see Najas flexilis Article 17 Backing Document (O Connor, 2013a).

Habitat code: 3130

Field label	Note
2.7.04 Structure and functions - Methods used	2 = Estimate based on partial data with some extrapolation and/or modelling No dedicated monitoring programme exists for lake habitat 3130 in Ireland and a standard method for assessing its conservation condition at individual sites has not yet been developed. Furthermore, the environmental requirements of the habitat have not been statistically demonstrated. A precautionary approach was used in assessing the structure and functions of habitat 3130, including assuming that it is associated with naturally oligotrophic waters as defined by the standard OECD approach (OECD, 1982). It must be acknowledged, however, that the habitat may be tolerant of some degree of enrichment. Research is required to establish 3130-specific water quality targets. Significant quantities of data on the general environmental and ecological status of Irish lakes are available. The Irish EPA is responsible for co-ordinating the Water Framework Directive (WFD) monitoring programme, for monitoring the lake biological quality elements (other than fish, which are monitored by Inland Fisheries Ireland) and for reporting on ecological status. The lake monitoring programme follows a three-year-cycle. EPA lake ecological status data for the years 2009-2011 inclusive were used to assess the quality of habitat 3130. 2009-2011 ecological status data were available for 93 or 22.3% of the 417 lakes mapped as having habitat 3130. Most of the lake indicators developed for WFD purposes (known as 'metrics' for the 'quality elements' specified in Annex V of the WFD) assess eutrophication impacts, notably: 1. Chlorophyll a status 2. Nutrient condition status 3. Macrophyte status 4. Phytobenthos status 5. Phytoplankton composition status These quality elements, as well as acidification/alkalisation, were used to assess the conservation condition of the structures and functions of the 93 monitored lakes with habitat 3130. Final ecological status (2009-2011) was not used as it incorporates fish status and it is unlikely there is a correlation between fish status and the status of habitat 3130. Final ecological status also incorporates information on the occurrence of alien invasive species; zebra mussels and roach. Alien invasive species are here considered potential pressures to habitat 3130. Their presence alone is not, however, considered sufficient to warrant a change in structure and functions condition from good to poor. As for other pressures, such as eutrophication and acidification, any impact of alien invasive species should be detected through appropriate biological and physico-chemical monitoring. WFD high status reflects oligotrophic conditions (as defined by the standard OECD approach incorporating data on chlorophyll a and total phosphorus concentrations), while WFD good status reflects mesotrophic conditions. As noted above, it was assumed that habitat 3130 requires oligotrophic conditions. This is in line with the targets used for Najas flexilis , a characteristic species of the habitat (O Connor 2013a). This target may be overly stringent for both the species and the habitat, however, expert judgement considers the alternative WFD target of 'good status' to be insufficient to ensure favourable structure and functions. It is likely that the most appropriate target lies somewhere between the high/good and the good/moderate boundaries established for WFD purposes. When one considers, however, that summer chlorophyll a typically had a concentration of c. 4 µg l-1 in Irish lakes considered to be in reference condition (Free et al., 2006) and given that Najas flexilis was formally more widespread in Ireland and Europe (Godwin, 1975), it is reasonable to assume that favourable and viable populations of the species and, by extension, its habitat, existed in oligotrophic lakes before large-scale anthropogenic land-use change.

See O Connor (2013 a and b) for further discussion on this issue.
The status of each of the listed quality elements was examined for the monitored lakes with habitat 3130. High status was considered equivalent to favourable/good conservation condition, 'good' status equivalent to poor conservation condition, while moderate, poor or bad status was considered equivalent to bad conservation condition. Similarly, the target used for acidification/alkalisation status was high status. For the structure and functions to be considered to be in favourable condition, all six elements must reach high status. This use of the lowest common denominator of the six quality elements is in keeping with final ecological status classification under the WFD, which is derived by taking the lowest status classes for the full range of specified biological, physico-chemical and hydromorphological quality elements (Tierney, et al. 2010).
WFD status for the monitored lakes with 3130 for the period 2009-2011, converted to Habitats Directive terms, was as follows:
1. Chlorophyll a status – 42% of the 90 monitored lakes in good condition, 25% at poor and 33% at bad.
2. Nutrient condition status – 32% of the 93 monitored lakes in good condition, 38% in poor and 30% in bad.
3. Macrophyte status – 25% of the 90 monitored lakes in good condition, 38% at poor and 37% at bad.
4. Phytobenthos status – 44% of the 32 monitored lakes at good condition, 47 % in poor and 9% in bad.
5. Phytoplankton composition status – 30% of the 30 monitored lakes at good condition, 40% in poor and 30% in bad.
6. Acidification/alkalisation status – 95% of 93 monitored lakes in good condition, 5% in bad.
7. Final conservation condition – 10% (or 9) of the 93 monitored lakes were in good condition, 42% (or 39) were in poor condition and 48% (or 45) were in bad condition.
It is worthy of note that had the Final ecological status (2009-2011) been used, 7% of the lakes would have reached good condition, 34% poor and 59% bad.
Eutrophication is the most likely impact in lakes with 3130, so the EPA ecological status data are an important indicator of the condition of the habitat at individual sites. It is possible, however, that the metrics are not sensitive to other impacts that are likely to occur in these lakes, given the pressures documented in their catchments. These other impacts include increased turbidity, sedimentation, increased dissolved and particulate organic carbon loads, hydrological changes and acidification.
The result of the structure and functions assessment using WFD data indicates that 42% of lakes monitored were in poor condition and 48% were in bad condition, suggesting that the national status of the structure and functions of habitat 3130 is bad. However, given that the high status target is likely to be overly stringent, it is possible that many of the 3130 lakes assessed as poor condition (moderate WFD status) are in fact favourable. Given:
1) this uncertainty around the use of the high status target, as well as
2) uncertainty as to the applicability of the more recently developed WFD tools (macrophyte, phytobenthos and phytoplankton composition) to assessing the condition of habitat 3130,
3) the low confidence in the mapped distribution of the habitat (see 1.1.2),
4) the fact that habitat 3130 occurs in naturally more rich lakes than habitat 3110 and the assumption, therefore, that
5) it is more tolerant of enrichment,
it is considered necessary to treat these results with significant caution.

Habitat code: 3130

Field label	Note
	Consequently, using WFD status data and expert judgement, the national status of the structure and functions of habitat 3130 was assessed as inadequate. It should be noted that the low percentage of monitored lakes with habitat 3130 at WFD high status and high percentage at moderate, poor or bad status give rise to significant concern.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the habitat is distributed throughout Ireland, but examples with Najas flexilis are concentrated along the western coast. As there is no evidence of a decline in range since the Directive came into force and the area of the range is large, the range is considered to be favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The estimated area of the habitat is 558.4 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 46% of the total area with lake habitats (3110, 3130, 3140, 3150, 3160), the area is considered to be favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although there has been no dedicated monitoring of habitat 3130 during the period, detailed biological and physico-chemical data are available for 93 (or 22.3%) of lakes with habitat 3130. Using these WFD data and expert judgement, the national status of the structure and functions of habitat 3130 was assessed as inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Tierney et al. (2010) illustrated the long-term trend in trophic status in Irish lakes, expressed in accordance with the areas of monitored lakes. The authors stated that 'the percentage of lake area in each trophic category has remained relatively stable since 1998, based on the modified OECD scheme' suggesting that the short-term trend in lake habitat quality generally is stable. The EPA and local authorities have examined and reported on chlorophyll a in twenty-two lakes continuously in each three-year water quality review period since 1976, and a further five lakes have continuous data since 1982. This dataset was examined for general chlorophyll a trends in oligotrophic and mesotrophic lakes (see Najas flexilis backing document for further information, O Connor, 2013a). While no clear trend emerged for the 14 lakes examined, the overall impression was of stable or even decreasing chlorophyll a concentrations. A rise in chlorophyll a concentration was suggested in three lakes. The presence of zebra mussels in eight of the 14 lakes, however, may have masked increases in productivity. The conclusion for the trend in the structure and functions based on national trends in the percentage area of lakes in oligotrophic/mesotrophic status and chlorophyll a concentrations in 14 oligo- and meso-trophic lakes is stable. It must be stated, however, that the confidence in this conclusion is low and that a recent report under the EPA STRIVE research programme on the protection of high status waters concluded the following: Under the WFD, there is a requirement to prevent the deterioration of water quality, and yet there has been a persistent and dramatic decline in the highest status rivers in Ireland. While there is no equivalent monitoring evidence for lakes and transitional or coastal waters, it is likely that significant declines may also have occurred (Ní Chatháin et al., 2013). This demonstrates that it is not possible to track trends in the water quality of high status lakes. Given the general stable trend in oligotrophic and mesotrophic lakes, the trend in the Structure and Functions of habitat 3130 is considered to be stable.

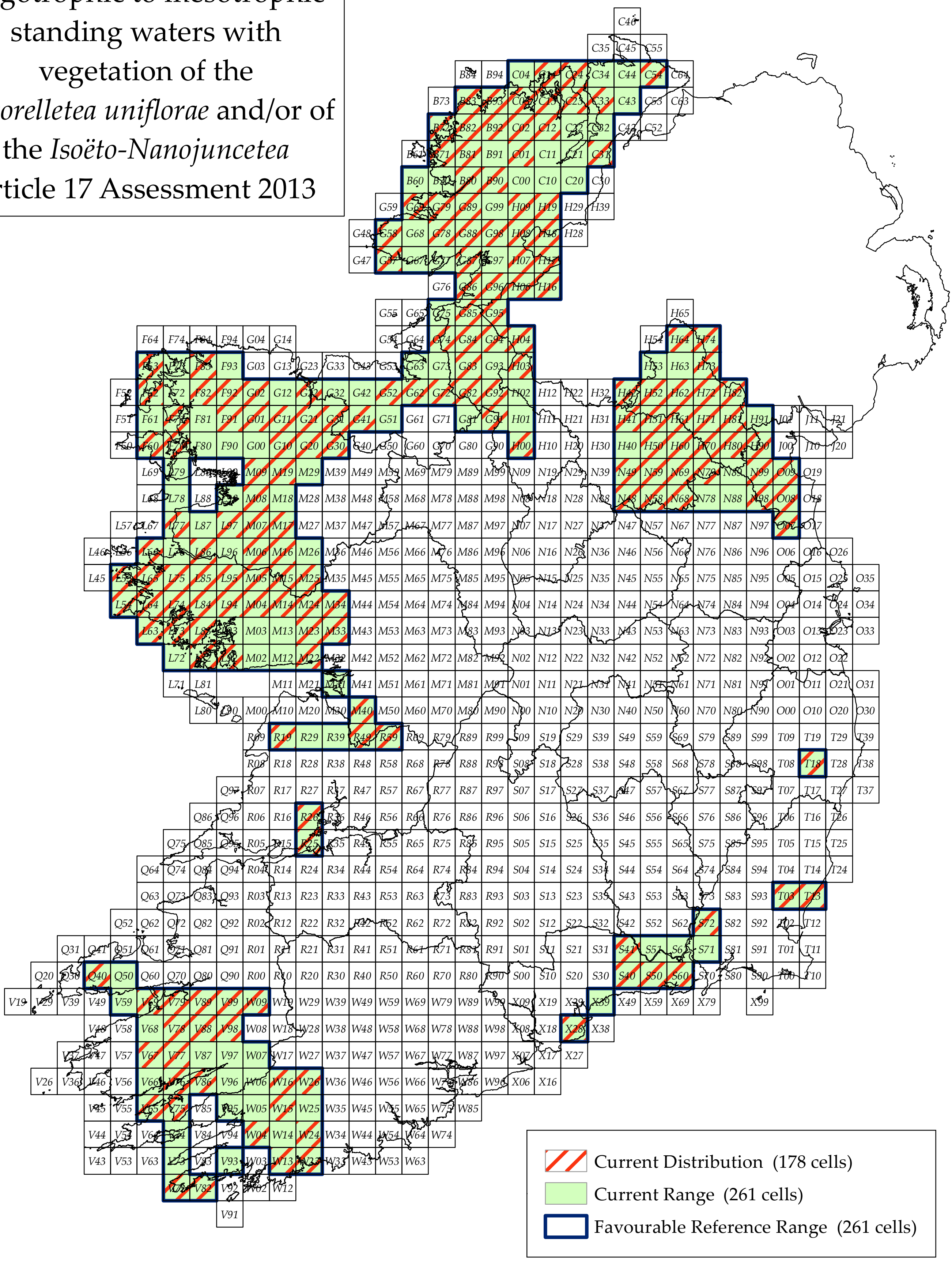
Field label	Note
Habitat code: 3130	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. A number of important WFD measures are likely to contribute to the protection of and improvements in lakes with 3130, particularly the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS), national investment in municipal wastewater treatment and regulation of such discharges by the EPA. These measures should, with time, lead to reductions in pollutant losses from once-off houses and municipal wastewaters. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. It must be recognised, however, that a very large number of DWWTS need to be inspected nationally and that this will take a significant amount of time. The current RBMP measures are likely to be insufficient to protect habitat 3130, however, for a number of reasons, most notably: 1. An objective of good status applies to all lakes not currently at high status (93% of monitored 3110 lakes, see 'final ecological status' 2.7.4) and, if the habitat is found to require high status, this will not allow for its restoration. Furthermore, if the appropriate objective for lakes with 3130 lies somewhere within good status class, as currently defined by the EPA, deterioration within the class will not be captured by the RBMP objectives. 2. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status in areas of Ireland with high rainfall and/or organic soils. Given that the majority of phosphorus lost to surface waters has an agricultural origin, this is a significant concern and means that the current measures may not even succeed in preventing further deterioration of lake water quality. 3. There are currently no measures to address the impacts of drainage on surface waters. It is assumed, therefore, that current and future RBMP cycles will lead to a gradual reduction in pressures from DWWTS and municipal wastewaters. Unless an appropriate objective is established for lakes with habitat 3130, however, the standards applied to such wastewaters may not be sufficiently stringent. It is likely that maintenance or restoration of habitat 3130 would require dedicated Sub-basin Management Plans with more stringent objectives and specific measures to address catchment-specific pressures, particularly diffuse pollution from agriculture, forestry and peat-cutting, and hydrological and acidification pressures associated with peatland drainage. Agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and current agricultural policy supports food production and land intensification. Conservation actions to rehabilitate and restore blanket bogs (Reasoned opinion 2010/2161) and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some 3130 catchments. However, economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural

Habitat code: 3130

Field label	Note
	reclamation of peat and peaty soils is ongoing in the west, in particular. Given the unfavourable inadequate status of the habitat's structure and functions and the pressures and threats identified, the future prospects are assessed as unfavourable inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The National Inspection Plan for domestic wastewater treatment systems, as well as measures to reduce pollution from municipal and industrial wastewaters are expected to lead to significant reductions in nutrient losses from these sources. The works involved in the implementation of these measures are likely, however, to result in a time delay before improvements become evident. Agriculture continues to export the majority of phosphorus to surface waters and the RBMP measures for agriculture are considered insufficient, particularly in areas with peatland, other peaty soils and high rainfall such as are typical of the catchments of habitat 3130. The lack of measures to tackle drainage and degradation of peatland and related losses of pollutants are also negative future prospects indicators. On balance, the reduced losses from domestic, municipal and industrial wastewaters are likely to be counteracted by continuing and, possibly increasing, losses from agriculture and peatland and the future prospects of habitat 3130 are considered to be stable.
2.8.05 Overall assessment of Conservation Status	The main problems for lake habitats in Ireland are damage through eutrophication and other processes linked to water pollution and hydrological change, rather than habitat loss and destruction. Consequently, the conservation status of the range and area of habitat 3130 were assessed as favourable. No dedicated surveillance of habitat 3130 or its character species Najas flexilis has been conducted during the reporting period, and WFD water quality data and older information on the Annex II species were used to assess the status of the habitat's structure and functions. An expert judgement led review of the data for 93 lakes with habitat 3130 concluded that structure and functions are currently inadequate, but stable. The pressures and threats on habitat 3130 are indirect, arising within the catchments of the occupied lakes. Agriculture and domestic wastewater systems are the most significant pressures and threats for habitat 3130, particularly where they are associated with peatland or other peaty soils. Peat-cutting and forestry on peatland are other notable pressures. While significant measures are being implemented to address pollution from domestic wastewater systems, action to reduce losses from agriculture, the largest source of phosphorus to water, is considered inadequate and there are currently no measures to address the impacts of peatland drainage and general degradation. As a result, the future prospects for the habitat were also inadequate, but stable. The overall conservation status of lake habitat 3130 is assessed as unfavourable inadequate.

Field label	Note
Habitat code: 3130	
3.1.02 Method used	The shapefile of lakes with habitat 3130 was intersected with the shapefile of the SAC network and all lakes occurring within the network selected. 53 of the 417 lakes assigned habitat 3130 were within the network. These totalled 26.5 km2 in area. In addition, a shapefile was created of the 1,214 lake segments > 1ha in area that were not examined during the lake habitat assessments (2007-2012). This shapefile was intersected with the SAC network and 210 unexamined lakes with a total area of 12.3 km2 found within the network. Using the same correction factor (- 6.3%) and percentage area of lakes with habitat 3130 (46%) used in 2.4.1, the additional area of habitat 3130 within the network was estimated as 5.3 km2. Summing these two figures (26.5 km2 and 5.3 km2) gave a total area of 31.8 km2 of habitat 3130 within the network. The same method was used to estimate the area of the habitat within SAC selected for its protection (figure given in 2.7.5). Nine lakes with habitat 3130 totalling 5.8 km2 in area were found within the nine SAC selected for the habitat. 33 unexamined segments, totalling 3.0 km2 were found within the nine SAC. Therefore, 1.3 km2 of habitat 3110 was estimated to occur within the nine SAC from the unexamined segments, bringing the total to 5.8 km2 plus 1.3 km2 or 7.1 km2.
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC and also where the Annex II species, Najas flexilis is listed as a qualifying interest (Measure 6.3). Conservation objectives for habitat 3130 and Najas flexilis in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment through Article 6 (3). As Najas flexilis is protected under the Wildlife Acts, Flora Protection Order 1999 (S.I. No. 94) (Measure 6.3), the habitat is afforded protection against direct damage. The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. There are, however, no conservation measures currently being undertaken to restore or enhance areas of 3130 habitat within SAC. More detailed surveillance of the habitat would be required before such measures could be planned. The Programmes of Measures (Measure 4.1) under the WFD River Basin Management Plans will help improve water quality generally, however, their focus is on improvement of poor quality rather than maintenance or restoration of the highest quality.

Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta

Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3140

NAME: Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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Ní Chatháin, B., Moorkens, E. and Irvine, K. (2013) Management Strategies for the Protection of High Status Water Bodies. 010-W-DS-3. Strive Report Series No. 99. EPA, Wexford.
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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

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2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	25200	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	25200
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. This is smaller than the FRR set in 2007 (42,000 km2) owing to the improved method of mapping the habitat's distribution. The main reasons for the reduction were: 1. the incorporation of new data and better use of older data on charophytes, 2. a better understanding of the habitat, 3. the separation of habitats 3110 and 3130, which were not distinguished in 2007, and the mapping of natural eutrophic lake habitat (3150), which was not mapped in 2007, 4. the removal of turloughs, lagoons, artificial waterbodies and other non-lake segments, and 5. the removal of lake segments of less than one hectare in area unless site-specific information identified the presence of the habitat in the small lake/pond. It should be noted that Range is likely to be an insensitive measure for the conservation status of lake habitats. Lakes can be 'created' by the damming of rivers and while their area can be reduced through drainage or processes of natural succession, they are unlikely to be destroyed. In a temperate, oceanic climate such as that of Ireland, it is unlikely that the range of habitat 3140 will ever change. The quality of the habitat (structures and functions) may deteriorate significantly and this is the key measure of the conservation status of the habitat. It is assumed throughout this assessment that restoration of habitat 3140 is possible regardless of the severity of the deterioration in habitat quality.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	556
2.4.2 Year or period	2000-2012
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.4 Short-term trend period	2001-2012
2.4.5 Short-term trend direction	stable (0)
2.4.6 Short-term trend magnitude	min / max / confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.8 Long-term trend period	1989-2012
2.4.9 Long-term trend direction	stable (0)
2.4.10 Long-term trend magnitude	min / max / confidence interval
2.4.11 Long term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.12 Favourable reference area	area (km) 556 operator N/A unknown No method As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 49% of the total area estimated to have lake habitats (3110, 3130, 3140, 3150, 3160), it can be assumed that the current area is large enough to allow the long-term survival of the habitat. As a result, the surface area is set as the Favourable Reference Area.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
diffuse groundwater pollution due to non-sewered population (H02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A

diffuse groundwater pollution due to non-sewered population (H02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Ophrydium versatile

Oscillatoria

Chara aculeolata

Chara aspera

Chara contraria

Chara curta

Chara denudata

Chara globularis

Chara rudis

Chara virgata var. annulata

Chara virgata

Nitella flexilis

Littorella uniflora

Phragmites australis

Potamogeton gramineus

Potamogeton nitens

Potamogeton perfoliatus

Schoenoplectus lacustris

Utricularia vulgaris

Ochthebius nilssoni

2.7.2 Species method used	Data from Roden and Murphy (in press, in prep.), as well as EPA macrophyte raw data from routine Water Framework Directive monitoring (2007-2012) (charophytes not identified to species) and expert judgement were used to determine the status of typical species as part of the overall assessment of the structure and functions.
2.7.3 Justification of % - thresholds for trends	

2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Range and Area are likely to be insensitive measures for the conservation status of lake habitats and are unlikely to change significantly between reporting periods. The quality of the habitat (structures and functions) is the key measure of the current conservation status of the habitat. The structure and functions assessment, combined with information on pressures and their associated drivers, determine the future prospects assessment. An estimated 304.7 km2 of lake area was considered to have habitat 3140 within the 18 SAC where habitat 3140 is a qualifying interest for the site. Not all lake segments were examined during the lake habitat (3110, 3130, 3140, 3150 and 3160) distribution mapping process. Given that a significant number of these were located on limestone, it is likely that 527 is an underestimate of the number of lakes in Ireland with habitat 3140 and that the 10 km distribution, while broadly accurate, may be missing a small number of grid squares.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	419.7	max	419.7
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Enhance Long term

Field label	Note
Habitat code: 3140	
0.2 Habitat code	Habitat 3140, Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. is strongly associated with lowland lakes over limestone bedrock, particularly Dinantian pure bedded limestone. The habitat is also found on calcareous sand at the landward side of machair plains, along the north-western coast. Habitat 3140 is dominated by algae, particularly Chara species, but is also of international conservation importance for its krustenstein, a cyanobacterial crust that is found on bedrock, stones and cobbles in shallow waters to 2 m depth (Roden and Murphy, in press). The crust is species rich, but the cyanobacterium Schizothrix fasiculata dominates in terms of abundance. A variant of the crust can also form on hard submerged peat and occasionally on loose pebbles forming rounded 'oncoliths'. A very rare water beetle, Ochthebius nilsonni is associated with the krustenstein in a number of Irish hard water lakes. Charophyte diversity is high in Irish 3140 lakes, and includes a number of rare and threatened species (Stewart and Church, 1992). A characteristic depth-related vegetation zonation has been described from Irish hard water lakes, with up to six distinct zones (Roden and Murphy, in press, in prep.). This type of vegetation is uncommon in the EU and some of the best European examples occur in Ireland. As a result, Ireland has a special responsibility with respect to habitat 3140. The high alkalinity and calcium and magnesium concentrations in hard water lakes are the result of the significant groundwater contribution to these lakes. The catchments of many hard water lakes are dominated by groundwater pathways, rather than surface run-off and rivers. This distinguishes hard water lakes from other lake habitats, but is a common feature with the priority habitat turloughs (3180) and, indeed, habitats 3140 and 3180 co-occur at a number of sites. Habitat 3140 is under significant pressure from eutrophication, the primary sources of pollutants being agriculture and municipal and industrial wastewaters. Pollutant pathways through groundwater are a significant concern, in particular the high phosphate concentration recorded in karst aquifers (Craig et al., 2010).
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

Field label	Note
Habitat code: 3140	
1.1.02 Method used - map	The distribution of habitat 3140 in Ireland was based on mapped lakes. The "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 12,217 separate polygons. A number of rules were applied during the process of assigning habitat 3140 to these polygons, in summary: 1. Polygons for the priority habitat coastal lagoons (habitat code 1150) were removed from the dataset. 2. Habitat 3140 was not assigned to any segments of less than 1 ha in area unless site-specific data or knowledge existed to demonstrate its presence. Areas of Clare and south Galway are known to have a significant number of very small lakes/ponds that contain excellent examples of the hard water lake habitat. 3. Habitat 3140 was assigned to waterbodies that also contain the priority habitat turloughs (3180) as well as tolakes with habitats 3130 (Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea), 3150 (Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation) and, at a limited number of sites, 3110 (Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)). 4. Data on aquatic macrophytes were used to identify lakes with habitat 3140. The principal data sources for habitat 3140 were: Roden and Murphy (in press, in prep.), Roden (1999, 2000, 2012), Bruinsma et al. (2009) and Heuff (1984). Charophyte records, collated and frequently also collected by Nick Stewart for the aquatic plant atlas (Preston and Croft, 2001) were also reviewed. Data gathered as part of EPA-funded Water Framework Directive (WFD) related research (Free et al., 2006, 2009) and during routine WFD macrophyte monitoring by the EPA (data from 2001-2012 used) were also used. Dr Cilian Roden also identified important hard water lake sites (Roden, pers. comm.). 5. Geological data, physico-chemical data, satellite imagery and orthophotography were used, in combination with expert judgement, to identify lakes with 3140 for which no macrophyte data were available. All lakes on pure-bedded limestone were assigned to habitat 3140. 6. The full distribution of habitat 3140 was reviewed, with particular attention given to gaps in the 10 km distribution overlying limestone bedrock, and corrections made as necessary. The full distribution mapping process is detailed in Appendix II of the lake habitat backing document (O Connor, 2013b). This process resulted in a map of the lakes in which habitat 3140 occurs. Of the 3,719 lakes with an area of greater than 1 ha in the national dataset, 2,505 were examined and 453 were classified as having habitat 3140. 74 lakes of less than 1 ha in area were also classified as having habitat 3140. The distribution of the habitat was based on these 527 lake segments. The 527 lake segments with habitat 3140 were intersected with the Irish National 10 km Grid, producing a distribution of 167 10 km squares. The habitat was distributed across 18 counties (Cavan, Clare, Donegal, Galway, Kerry, Kilkenny, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Waterford, Westmeath and Wexford). Given that 5,463 lake segments were not examined during the distribution mapping process and that a significant number of these were small in area (4,249 <1 ha) and located on limestone, it is likely that 527 is an underestimate of the number of lakes with habitat 3140. As particular attention was paid to 10 km squares that overlie limestone bedrock, however, the 10 km distribution is considered to be accurate. The rules adopted for distribution mapping differed from those used in 2007 in a number of respects, most significantly in that, in 2007:

Field label	Note
Habitat code: 3140	
	1. Only one lake habitat was assigned to each lake, 2. A lake habitat was assigned to 11,924 WFD lake polygons from the 2007 dataset, including ponds of < 1 ha in area, coastal lagoons and turloughs. For this assessment (2013), lake habitats were assigned only to segments that were examined as detailed above. Lake habitat were not assigned to 476 segments (or 7.1% of the polygons examined, by number) because they were found to be turloughs, lagoons, artificial ornamental ponds, mill ponds, reservoirs, fens, bogs, quarry ponds, mine tailings or other (often non-wetland) features. 3. No lake polygons were classified as having lakehabitat 3150 in 2007 and lake habitats 3110 and 3130 were not separated. The net result was that the number of lake segments with habitat 3140 was significantly overestimated in 2007. Lakes with habitats 3130 and/or 3150 were most commonly misclassified as 3140 in 2007.
1.1.03 Year or period	The distribution was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs. Macrophyte data used were of various ages, but principally dated from the period 2001-2012.
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps using the recommended Range Tool. It should be noted that some of the unoccupied 10 km squares within the range are unlikely to have habitat 3140 as they are dominated by acid geology and soils, and/or areas of upland.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressure and threats.
2.3.02 Method used - Range	See 1.1.2, 1.1.4 and 1.1.5 above, and O Connor (2013b) for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.09 a) Favourable reference range - In km2	As there is no evidence of a decline in range since the Directive came into force, the area of the range is large at approximately 29% of the terrestrial grid and the habitat is widespread (covering 18 counties), it can be assumed that the current range is large enough to allow the long-term survival of the habitat. As a result, the current range is set as the Favourable Reference Range. This FRR is more accurate to that reported (42,000 km2) in 2007, when the distribution mapped habitat 3140 as occurring in 10 km squares with no natural lakes or dominated by acid geologies.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Two significant, conservation-driven studies have improved the ecological understanding and knowledge of the distribution of habitat 3140 in Ireland (Roden and Murphy, in press, in prep.). Routine Water Framework Directive monitoring by the Irish EPA of lake macrophytes at more than 220 lakes has also significantly increased the available data on Irish lake habitats. In addition, this assessment made greater use of older studies on lake vegetation (e.g. Heuff, 1984, Roden, 1999, Free et al., 2006, 2009).

Field label	Note
Habitat code: 3140	
2.3.10 c) Reason for change - use of different method	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of a different approach to mapping the distribution of the habitat and the new range tool. The main reason for the change in the range was the different approach taken to mapping the habitat's distribution. This is described in sections 1.1.2 and 2.3.9 d) above, and in greater detail in O Connor (2013b). The principal differences were the removal of non-lake habitats from the distribution, the incorporation of additional biological data and the separation of habitats 3130 and 3150. A significant number of lakes with 3130 and/or 3150 were mapped as hard water lakes in 2007. The recommended Range Tool was used and this has been demonstrated to produce a significantly larger range to method of range mapping used in 2007 (see O Connor, 2013a).
2.4.01 Surface area	The surface area of the habitat was based on the surface area of the lakes containing the habitat. A two-step process was adopted. Firstly, the area of all 527 lake segments identified as containing habitat 3140 was summed (see 1.1.2 and O Connor (2013b) for further information on 3140 lake distribution). The summed lake surface areas came to 51,532.68 ha or 515.3 km2. Secondly, it was assumed that some of the 5,463 lake segments that were not examined also contain habitat 3140. Owing to the significant number of errors identified in the national dataset, a correction factor was generated (see O Connor, 2013b for further information on errors). This was based on the percentage area of lake segments examined to which no lake habitat was assigned. The total area of the 476 unassigned polygons was 7,646 ha. This represents 6.3% of the total area (121,971 ha) of the 6,669 polygons examined. The total area of the 5,463 lake segments that were not examined was 96.5 km2. This was reduced by 6.3% to 90.4 km2, to take account of the errors in the dataset. The total area of the 6,193 lake segments to which one or more of the lake habitats was assigned was 1,143.2 km2. 515.3 km2 or 45% of this area was assigned to 3140. 45% of 90.4 km2 is 40.7 km2. The two figures (515.3 km2 and 40.7 km2) were summed to give 556 km2. As some lakes can contain more than one Annex I lake habitat (habitat 3140 co-occurs with habitats 3130, 3150, 3180 and at a limited number of large lakes, with 3110), this figure is an overestimate of the actual area of the habitat. Even where habitat 3140 is the only lake habitat occurring, it may not cover an area equivalent to the surface area of the lake. Accurate mapping of submerged macrophyte communities is challenging and time-consuming, so that lake surface area is likely to remain the only available indicator of habitat area into the future.
2.4.02 Year or period	The surface area was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.4.10 c) Long-term trend - Magnitude- Confidence interval	The main reason for the change in the area of 3140 was the different approach taken to mapping the habitat's distribution. This is described in section 1.1.2 and 2.3.10 c) above and in greater detail in O Connor (2013).

Field label	Note
Habitat code: 3140	
2.4.12 d) Favourable reference area - Indicate method used to set reference value (if other than operators)	The current surface area (2.4.1), derived from the distribution (see 1.1.2) by summing the lake surface areas using the method described in 2.4.1 is considered to be the FRA, as there is no evidence of a decline since the Directive came into force. This is smaller than the FRA set in 2007 (595 km2) owing to the different method of mapping the habitat's distribution. The main reasons for the reduction were the removal of lake segments of less than one hectare in area unless site-specific information identified the presence of the habitat, the removal of artificial waterbodies, turloughs and lagoons from the 3140 distribution and the reclassification of some lakes as having habitat 3130 and/or 3150. As with Range, area is likely to be an insensitive measure for the conservation status of lake habitats. It is unlikely that any significant increases or decreases in lake surface area will occur in Ireland and, hence, the conservation status of both area and range will remain favourable. As noted in 2.3.9 d), habitat quality (structures and functions) is the key measure of the conservation status of lake habitats.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	See 2.3.10 b) which describes the improved knowledge used in this assessment.

Habitat code: 3140

2.5 Main pressures

The pressures impacting on habitat 3140 are indirect, arising within the catchments of the occupied lakes. The vast majority of these pressures lead to pollution with dissolved and particulate nutrients or organic matter. Direct impacts on the habitat have seldom been documented in Ireland. Impacts from invasive alien species have been recorded, notably the macrophyte Lagarosiphon major and the zebra mussel in Lough Corrib, however, the expansion of these species appears to be intrinsically linked with eutrophication of the habitat. Understanding the pressures on habitat 3140 is further complicated by the significant groundwater contribution to hard water lakes. The precipitation of calcium carbonate in hard water lakes demonstrates that a large percentage of the lake's water has at one time travelled through the ground, and specifically, base-rich bedrock or deposits. It is, however, difficult to determine the exact groundwater contribution to a hard water lake, owing to the multiple and dispersed groundwater discharge points. Groundwater may discharge into inflowing streams or directly into the lake itself and the discharge points may vary in location and flow rates over time. This is an area worthy of significant investigation, as understanding groundwater flow paths and discharges is key to the identification of important sources of pollution and prioritisation of mitigation measures for hard water lakes. Craig et al. (2010) noted that elevated phosphate concentrations have been measured in the karstified aquifers, particularly where the groundwater is vulnerable to pollution and there are shallow soils and subsoils. Groundwater phosphate concentrations are currently measured against the phosphate standard for rivers of 35 µg P l-1. This is a cause for concern because a sustained contribution of 35 µg P l-1 in dissolved form from groundwater could rapidly lead to exceedances of the 10 µg P l-1 or 20 µg P l-1 total phosphorus targets for oligotrophic or mesotrophic lakes. It is recommended that catchment-specific targets should be established for phosphorus in groundwater in hard water lake catchments.
Habitat-specific information, documented pressures on general water quality, and expert judgement were used to determine the pressures on lake habitat 3140. The main information sources were:
1. Pressures on hard water lakes documented by Roden and Murphy (in press, in prep), as well as Roden (1999, 2000 and 2012) and Bruinsma et al. (2009).
2. Water Framework Directive Reports (River Basin Management Plans, associated Water Management Unit Action Plans (http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%20 2009%20-%202015/) and the 2005 Article 5 Report (http://www.wfdireland.net/wfd-charreport.html)).
3. National Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, EPA, 2008, http://testweb.epa.ie/irelandsenvironment/). Information on pressures on groundwater and lake water quality was examined.
4. Examination of OSi 2005 orthophotographs and more recent satellite imagery during the distribution mapping process.
The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on habitat 3140. The pressures identified, listed in an approximate order of importance, were:
1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance
2. H02.06, diffuse groundwater pollution due to agricultural and forestry activities, High importance
3. H01.01, pollution to surface waters by industrial plants, High importance (used here to cover discharges to groundwater also)
4. H02.07, diffuse groundwater pollution due to non-sewered population, High

importance
5. H01.09, diffuse pollution to surface waters due to other sources not listed, Medium importance (predominately peatland drainage and degradation)
5. H01.02, pollution to surface waters by storm overflows, Medium importance
6. I01, invasive non-native species, Low importance
7. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, Low importance
8. J02.06.02, surface water abstractions for public water supply, Low importance
Code H01.09 was used to indicate pollution arising from peatland drainage and other degradation in the lake's catchment. Roden and Murphy (in press, in prep.) documented peatland-related impacts in a number of hard water lakes. These included: increased colour, owing to humic acids and other dissolved organics; increased turbidity, owing to particulate peat; and deposition of peat sediment. It is assumed that because hard water lakes have natural temporal fluctuations in water level associated with rainfall patterns, peatland degradation does not lead to hydrological impacts. This assumption may be incorrect in catchments with a large percentage area of peatland habitats. The main drivers of peatland degradation are peat-cutting, afforestation and over-grazing by sheep, all of which lead to erosion and decomposition of peat.
Abstraction for drinking water occurs frequently across hard water lakes, however impacts have seldom been documented and the habitat appears to recover relatively quickly once the pressure is sufficiently reduced (Roden, 2010).
Lagarosiphon major is widespread in Lough Corrib and has impacted the charophyte communities (Roden and Murphy, in prep.). Zebra mussels also appear to have contributed to the decline in krustenstein in Lough Corrib (Roden and Murphy, in prep.).
Zebra mussel was recorded at 43 of the 78 hard water lakes monitored under the WFD, but it cannot be assumed to have negatively impacted the habitat at all of these sites. It occurred in eight of the study sites in Roden and Murphy (in prep.), however ecological impacts could only be assigned to the zebra mussel in Lough Corrib. Zebra mussels were abundant in three other lakes (Arrow, Cullaunyheeda and Derravarragh), but the decline of charophyte and krustenstein communities in those lakes appeared to relate to eutrophication impacts, such as increased abundance of filamentous algae, higher plants and phytoplankton, rather than competition for space with zebra mussels. In two lakes (Bleach and Lene) zebra mussels had low abundance and the authors said "It can be argued that lake enrichment leading to plankton blooms, krustenstein decay and a shallowing of the euphotic zone are necessary conditions for the explosive growth of the mussel, probably due to the filter feeder's need for a dense plankton concentration for growth." High abundances of zebra mussel may, therefore, only occur in lakes that suffer from eutrophication. In such lakes, the impact of zebra mussel on habitat 3140 is unclear. Colonisation of bedrock by zebra mussel could negatively impact krustenstein, however eutrophication has been shown to cause krustenstein decay in the absence of the zebra mussel (Roden and Murphy, in press). Perhaps the most likely impact of the zebra mussel is to cause a shift in primary production from phytoplankton to benthic communities, leading to charophytes being out-competed by filamentous algae and higher plants such as Elodea canadensis, Lemna trisulca and Potamogeton species, as was recorded in Loughs Arrow, Cullaunyheeda and Derravarragh (Roden and Murphy, in prep.).
Elodea nuttalli was recorded in Lough Arrow, however it appears to have been recently introduced and is not yet having a discernible impact on the habitat (Roden and Murphy, in prep.).
All of the other pressures listed result in increased nutrient loads and

Field label	Note
	eutrophication. Agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, followed by sewage discharges (see WFD Water Management Unit Action Plans). Other important exporters of nutrients are industry, septic tanks (domestic wastewater treatment systems) and forestry. Fertilisation of land using chemical fertilisers and manure is a particular concern and, as noted above, losses to hard water lakes can occur via a number of pathways and mechanisms. Direct loss where application is followed by heavy rainfall is generally not quantified in Ireland, but expert opinion considers it to be a significant concern. Losses from over-fertilised soil are most commonly studied and well documented in Ireland. Such losses can be transported in surface run-off, inter-flow or via groundwater to hard water lakes or their feeder-streams. Intensive agriculture, notably pig and fowl rearing units and dairy farming, is a significant pressure in hard water lake catchments. The storage of waste-products, and timing and location of manure spreading are particular concerns on these farms. Nutrient losses to ground from point sources require further investigation in hard water lake catchments. These could include both regulated and accidental discharges, the latter occurring as a result of extreme groundwater vulnerability and poor location of sources such as septic tanks or farmyards. It should be noted that there is no standard Pressures and Threats code to cover regulated, point-discharges to ground from municipal or industrial sources. Further information on how these pressures can impact on habitat 3110 is given in the backing document (O Connor, 2013b).
2.5.01 Method used - pressures	Information on pressures on hard water lakes from surveillance of the habitat, data on general water quality and expert judgement were used to determine the pressures on lake habitat 3140. See 2.5 for further information.
2.6 Main threats	All pressures documented at 2.5 were also listed as threats. In addition, climate change was identified as a threat. 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H02.06, diffuse groundwater pollution due to agricultural and forestry activities, High importance 3. H01.01, pollution to surface waters by industrial plants, High importance (used here to cover discharges to groundwater also) 4. H02.07, diffuse groundwater pollution due to non-sewered population, High importance 5. H01.09, diffuse pollution to surface waters due to other sources not listed, Medium importance (predominately peatland drainage and degradation) 5. H01.02, pollution to surface waters by storm overflows, Medium importance 6. I01, invasive non-native species, Low importance 7. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, Low importance 8. J02.06.02, surface water abstractions for public water supply, Low importance 9. M01, Changes in abiotic conditions, Low importance Peatland degradation has been identified as a pressure on habitat 3140 (H01.09). Warmer temperatures and greater seasonal variations in rainfall (droughts and floods) as a result of climate change, are likely to increase the decomposition of damaged peatlands, and the losses of dissolved and particulate organic matter, colour and ammonia to water, further increasing enrichment, sedimentation and acidification pressures. In addition, increased rainfall and, in particular, an increase in storm events would result in increases in direct losses of chemical fertiliser and manure from agricultural lands.

Field label	Note
Habitat code: 3140	
2.6.01 Method used - Threats	Information on pressures on hard water lakes and general water quality, and expert judgement were used to determine the threats on lake habitat 3140. See 2.5 for further information.
2.7 Complementary information	The typical species of hard oligo-mesotrophic waters with benthic vegetation of Chara spp. in Ireland are based on the 2011 and 2012 work of Cilian Roden and Paul Murphy on behalf on NPWS (Roden and Murphy, in press, in prep.). The vegetation of hard water lakes in favourable condition is dominated by algae, particularly Chara spp and krustenstein (an algal crust composed mainly of cyanobacteria, particularly Schizothrix fasiculata). Hard water lake vegetation has a characteristic zonation and higher plants are generally restricted to the Chara rudis zone and sheltered shorelines. The characteristic zones, with increasing water depth area as follows: 1. Krustenstein - Krustenstein with some small charophytes growing on rock and gravel 2. Chara curta - Communities dominated by Chara curta. These communities often extend into areas with sparse beds of Phragmites or Schoenoplectus, and other angiosperms may occur. 3. Chara rudis - Chara rudis communities occur at mid depth both as monospecific beds or with a diverse array of angiosperms including Hippuris vulgaris, Nuphar lutea, Myriophyllum verticillatum/spicatum, large Potamogeton species or Elodea Canadensis 4. Chara globularis - Below the Chara rudis unit, Chara globularis or Chara virgata can form extensive swards which extend to 8m below the surface. 5. Nitella flexilis/Chara denudata - The deepest macrophyte vegetation units consist of ecorticate charophyceae, either Nitella flexilis or Chara denudata; these communities extend to 9m depth 6. Oscillatoria - Mats of purple red Oscillatoria grow below the ecorticate charophyte zone close to the base of the euphotic zone. In places the mats are extensive, covering several square metres. Roden and Murphy (in prep.) noted that in 3140 lakes with euphotic depth of greater than 8 m do not show the typical zonation, having Chara contraria dominating at mid and deep water, where Chara rudis and Chara globularis/virgata normally occur. Degraded hard water lakes have abundant angiosperms, indistinct charophyte zones, loss of the characteristic deeper zones and damaged/decaying krustenstein. It is possible that hard water machair lakes naturally have reduced charophyte zonation and more abundant higher plants, and represent a third, natural sub-type. The core species of the characteristic zones were used as the typical species listed on the form (Roden and Murphy, in press). Ochthebius nilssoni is a vulnerable water beetle recently recorded in Ireland and otherwise known only from a single lake in northern Sweden (O'Callaghan et al., 2009, Foster et al., 2009). In Ireland the species is distinctly associated with krustenstein in hard water lakes. The species is now known from five hard water lakes in counties Clare, Galway and Mayo. In addition, a characteristic water beetle fauna of vegetation rafts in hard water lakes has been described (Nelson et al., in prep.). While this assemblage is not strictly associated with the krustenstein or charophyte flora, it is worthy of note and the characteristic species are: Agabus unguicularis, Hydroporus angustatus, H. memnonius, H. planus, H. striola, H. tessellatus, H. umbrosus, Ilybius ater, I. guttiger, I. quadriguttatus, Cercyon convexiusculus, Coelostoma orbiculare, Anacaena limbata, A. lutescens, Hydrobius fuscipes, Enochrus coarctatus, and E. testaceus.

Field label	Note
Habitat code: 3140	
2.7.04 Structure and functions - Methods used	In 2011, Roden and Murphy (in press) conducted baseline survey of three of the most important hard water lakes in Ireland: Lough Bunny, County Clare, Lough Carra, County Mayo and Lough Owel, County Westmeath. As part of this work, the authors developed a method for assessing the conservation condition of habitat 3140. Roden and Murphy then tested their methodology on 25 hard water lakes in 2012 (Roden and Murphy, in prep.). These two surveys assessed the conservation condition of the 28 lakes as follows: 1. By number, 15 lakes (or 53.6%) were in good conservation condition, seven (25%) in poor (inadequate) conservation condition and six (21.4%) in bad conservation condition. 2. As the lakes in the poorest condition included some of the largest lakes in Ireland, however, by area the results were 10.5% of the area of habitat 3140 surveyed was in good condition, 15.1% in poor condition and 74.4% in bad condition. Roden and Murphy (in prep.) said “the inescapable conclusion is that the greater part of the area of the marl lake habitat (hard water lakes 3140) within Ireland is poor or bad.” In addition to the targeted surveillance of habitat 3140 by Roden and Murphy (in press, in prep.), significant quantities of data on the general environmental and ecological status of Irish lakes are available through the Water Framework Directive (WFD) monitoring programme, which is co-ordinated by the Irish EPA. The lake monitoring programme follows a three-year-cycle and EPA lake ecological status data for the years 2009-2011 inclusive were also used to assess the quality of habitat 3140. 2009-2011 ecological status data were available for 78 or 15 % of the 527 lakes mapped as having habitat 3140. 20 of these were amongst the 28 surveyed by Roden and Murphy. Most of the lake indicators developed for WFD purposes (known as ‘metrics’ for the ‘quality elements’ specified in Annex V of the WFD) assess eutrophication impacts, notably: 1. Chlorophyll a status 2. Nutrient condition status 3. Macrophyte status 4. Phytobenthos status 5. Phytoplankton composition status These quality elements, as well as acidification/alkalisation, were used to assess the conservation condition of the structures and functions of the monitored lakes with habitat 3140. Final ecological status (2009-2011) was not used as it incorporates fish status and it is unlikely there is a correlation between fish status and the status of habitat 3140. Final ecological status also incorporates information on the occurrence of alien invasive species (zebra mussels and roach). Alien invasive species are here considered potential pressures to habitat 3140. Their presence alone is not, however, considered sufficient to warrant a change in structure and functions condition from good to poor. As for other pressures, such as eutrophication, any impact of alien invasive species should be detected through appropriate biological and physico-chemical monitoring. Habitat 3140 is variable, with two or perhaps three natural types recognised in Ireland (Roden and Murphy, in prep.). This variation is linked to a range of catchment characteristics including catchment size, geology, sub-soils and soils, as well as maritime influences. Hard water lakes with maritime influence and those in more-mixed catchments with deeper soils are considered to be naturally richer/more productive. Expert opinion and knowledge of these catchment characteristics were used to set site-specific targets for the monitored lakes. Naturally richer lakes were given a target of ‘good’ WFD status, which is equivalent to mesoptrophic conditions (as defined by the standard OECD

approach (OECD, 1982)). A target of 'high' WFD status was applied to lakes in catchments that are dominated by shallow soils and sub-soils and exposed limestone pavement (i.e. catchments with extreme groundwater vulnerability). This is because WFD high status reflects oligotrophic conditions. This approach could be considered insufficiently stringent, however, as the natural, un-impacted trophic status of all Irish hard water lakes is very likely to have been oligotrophic or even ultra-oligotrophic. On the other hand, hard water lakes by definition have a high groundwater contribution and groundwater pathways are expected to provide significant pollutant attenuation, while high calcium carbonate concentrations may also provide in-lake buffering against phosphorus enrichment.

For lakes with a target of high WFD status, WFD 'high' status was considered equivalent to Habitats Directive good conservation condition, WFD 'good' status was considered equivalent to poor/inadequate conservation condition, while moderate, poor or bad status was considered equivalent to bad conservation condition.

For lakes with a target of good WFD status, WFD 'high' or 'good' status was considered equivalent to Habitats Directive good conservation condition, WFD 'moderate' status was considered equivalent to poor/inadequate conservation condition, while poor or bad status was considered equivalent to bad conservation condition.

For the structure and functions to be considered to be in favourable condition, all six elements must reach the appropriate target (i.e. either high or good WFD status). This use of the lowest common denominator of the six quality elements is in keeping with final ecological status classification under the WFD, which is derived by taking the lowest status classes for the full range of specified biological, physico-chemical and hydromorphological quality elements (Tierney, et al. 2010).

First, comparing conservation condition derived from the WFD status data to the assessments of Roden and Murphy (in press, in prep.) for the 20 lakes, nine lakes were given the same conservation condition using both methods, eight lakes were given a better assessment using the WFD data (i.e. were assessed as good or poor condition using WFD data, but poor or bad using the methods of Roden and Murphy), and three lakes were assessed as poor using WFD data, but good by Roden and Murphy. While this demonstrates that the WFD data were not consistently reliable indicators of Habitats Directive condition, they did have a sufficient relationship to justify their use in the assessment of the remaining 58 lakes. The results were as follows:

1. 15% or 9 of the 58 monitored lakes were in Habitats Directive good conservation condition, 45% or 26 lakes were in poor/inadequate condition and 40% or 23 lakes were in bad condition.
2. 35% by area of monitored lakes were in Habitats Directive good conservation condition, 41% were in poor/inadequate condition and 24% were in bad condition. This result was dominated by Lough Conn, which was assessed as good conservation condition and at 4,704 ha made up 31% of the total lake area sampled.

Examining the individual quality elements, the condition was as follows:

1. Chlorophyll a status – 63% of the 57 monitored lakes in Habitats Directive good condition conservation condition, 28% at poor (inadequate) conservation condition and 9% at bad conservation condition.
2. Nutrient condition status – 24% of the 58 monitored lakes in good condition, 67% in poor and 9% in bad.
3. Macrophyte status – 24.5% of the 57 monitored lakes in good condition, 51% at poor and 24.5% at bad.

Field label	Note
	4. Phytobenthos status – 67% of the 21 monitored lakes in good condition, 28% in poor and 5% in bad. 5. Phytoplankton composition status – 33% of the 21 monitored lakes in good condition, 48% in poor and 19% in bad. 6. Acidification/alkalisation status – 93% of 58 monitored lakes in good condition, 7% in bad. Eutrophication is the most likely impact in lakes with 3140, so the EPA ecological status data are an important indicator of the condition of the habitat at individual sites. It is possible, however, that the metrics are not sensitive to other impacts that are likely to occur in these lakes. Roden and Murphy (in prep.) documented reduced water transparency and euphotic zone in a number of hard water lakes as a result of increased colour from humic substances and/or turbidity from particulate peat, both originating in degraded peatland. Given that: 1. Murphy and Roden (in press, in prep.) found that, of the 28 lakes with 3140 monitored, 10.5% by habitat area was in good condition, 15.1% in poor condition and 74.4% in bad condition, and 2. of the 58 additional hard water lakes monitored by the EPA during the period 2009-2011, 15% by number were in good condition, 45% were in poor condition and 40% were in badcondition.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the habitat is widespread, with the most important sites distributed across counties Galway, Mayo, Westmeath, Roscommon and Clare. The habitat is typically associated with Dinantian pure-bedded limestone or coastal calcareous sands. 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 29% of the terrestrial grid, the range is considered to be favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The estimated area of the habitat is 556 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 45% of the total area with lake habitats (3110, 3130, 3140, 3150, 3160), the area is considered to be favourable. Roden and Murphy (in prep.) have documented significant decreases in the area of charophyte vegetation within individual lakes, notably Lough Corrib. As the charophyte habitat is still in existence, however, and an increase in water clarity can reasonably be expected to lead to rapid recolonisation of that habitat, this is not considered a permanent loss.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Dedicated surveillance of habitat 3140 at 28 sites in 2011 and 2012 demonstrated that 10.5% of the surveyed habitat by area was in good condition, 15.1% in poor condition and 74.4% in bad condition. In addition, detailed biological and physico-chemical data are available for another 58 (or 11%) of lakes with 3140. Of these, 45% by number (or 41% by area) were in poor condition and 40% (or 24% by area) were in bad condition. Owing to the high percentage of lakes by number and area in bad condition, the national status of the structure and functions of habitat 3140 was assessed as bad.

Habitat code: 3140

Field label	Note
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Roden and Murphy (in press, in prep.) documented a significant decline in the condition of the habitat's structure and functions over time at a number of lakes, amongst them some of the most important Irish hard water lakes. Lough Carra demonstrated a significant increase in higher plant abundance and species richness and colonisation and expansion of Chara tomentosa over time (Roden and Murphy, in press). Roden and Murphy (in prep.) found a significant decrease in the euphotic depth in Lough Corrib between 2004 and 2012, as well as the near loss of krustenstein. Tierney et al. (2010) illustrated the long-term trend in trophic status in Irish lakes, expressed in accordance with the areas of monitored lakes. The authors stated that 'the percentage of lake area in each trophic category has remained relatively stable since 1998, based on the modified OECD scheme' suggesting that the short-term trend in lake habitat quality generally is stable. This analysis, however, combines oligotrophic and mesotrophic categories so that trends in oligotrophic lakes cannot be determined. Consequently, it is not possible to determine how representative this general lake trend is of the 3140 habitat, as many hard water lakes require oligotrophic conditions. The EPA and local authorities have examined and reported on chlorophyll a in twenty-two lakes continuously in each three-year water quality review period since 1976, and a further five lakes have continuous data since 1982. This dataset was examined for general chlorophyll a trends in oligotrophic and mesotrophic lakes (see Najas flexilis backing document for further information, O Connor, 2013a). While no clear trend emerged for the 14 lakes examined, the overall impression was of stable or even decreasing chlorophyll a concentrations. A rise in chlorophyll a concentration was suggested in three lakes. The presence of zebra mussels in eight of the 14 lakes, however, may have masked increases in productivity. Ní Chatháin et al. (2013) examined trends in high status water bodies over time. They stated that significant declines in lake quality may have occurred but were uncertain, owing to the sporadic nature of lake monitoring and the focus on lakes with water quality problems before the WFD monitoring programme began. The significant declines in high status rivers, however, give rise to concern. The decline in river water quality is overwhelmingly related to enrichment. An increase in nutrient loads to rivers that results in deterioration of river biological quality is likely to have a proportionately greater impact on downstream lakes, because of the rapid cycling and movement of nutrients through river systems and the significantly longer retention time in lakes. Ní Chatháin et al. (2013) documented a steady decline in monitored high status river sites from 41% in 1998-2000, to 37% in 2001-2003, 31% in 2004-2006, and 27% in 2007-2009. Even allowing for a reduction in the number of river sites monitored, this represented a loss of 280 high status sites between 1998 and 2009 (this is an adjusted figure - the actual reduction in the number of sites achieving Q5/Q4-5 was 369) (Ní Chatháin et al., 2013). Of particular concern for habitat 3140 were the significant losses of high status river sites in counties with a high density of lakes with that habitat, particularly Mayo (33), Sligo (31), Clare (21), Leitrim (21), Cavan (18) and Galway (14). Status was based on macroinvertebrate monitoring and included both Q5 and Q4-5 sites (Ní Chatháin et al., 2013). Only 41 of the 407 river sites classified as at high status for the 2007-2009 monitoring period were at Q5 (366 at Q4-5), again indicative of the deterioration in the highest quality river sites (Ní Chatháin et al., 2013). Trends in phosphorus in groundwater between the 1995-1997 and 2007-2009 monitoring periods suggest a general decline in concentrations nationally (Craig, et al., 2010). Such trends need to be treated with caution at this time, however, owing to the few historical groundwater phosphorus sampling stations and high

Habitat code: 3140

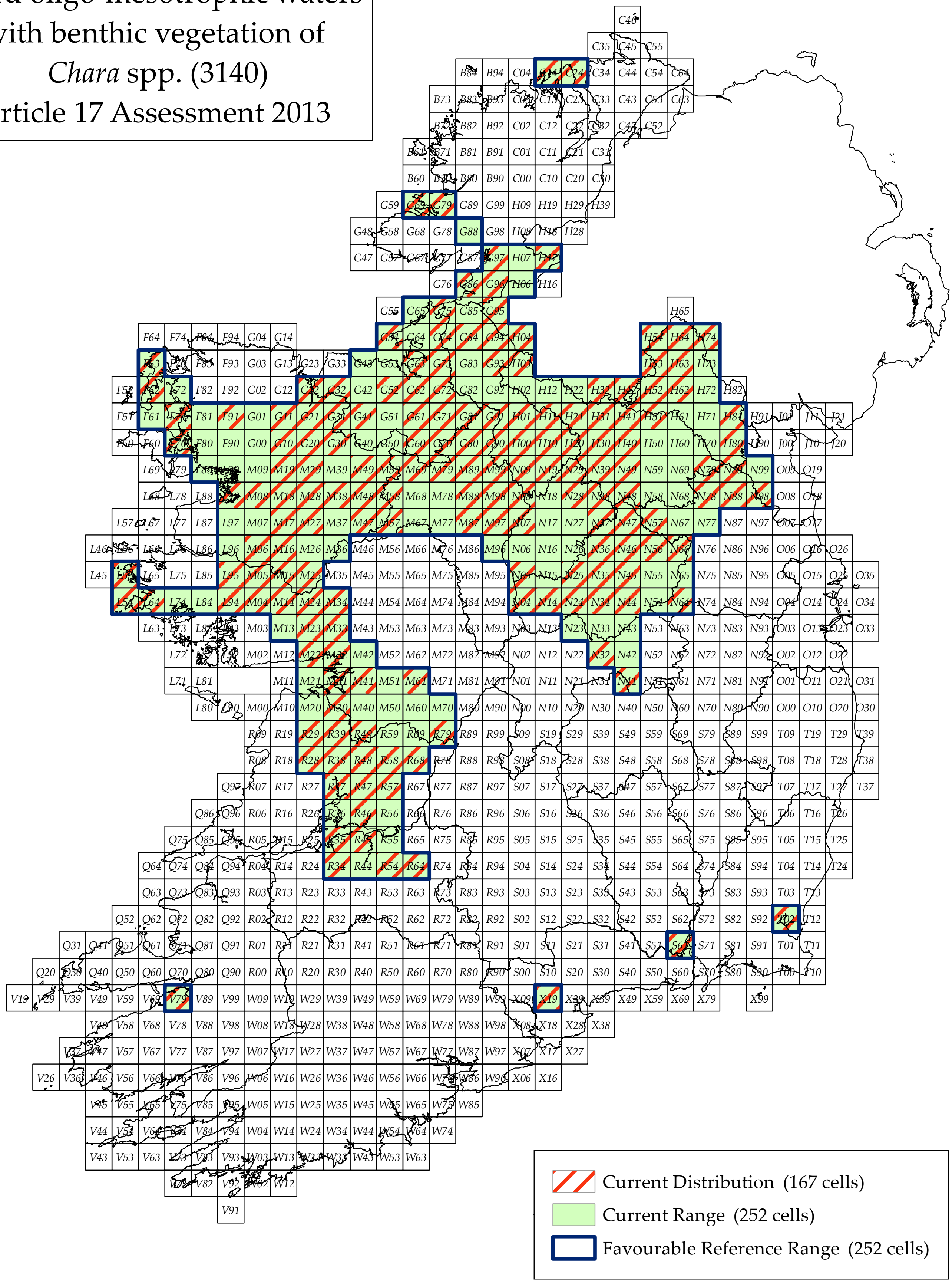
limit of detection. As groundwater phosphorus monitoring efforts have increased significantly under the WFD and limits of detection have been improved, EPA groundwater quality data should provide very useful trend indicators for the structure and functions of hard water lakes in future Article 17 reports. The elevated phosphate concentrations measured in the karstified aquifers are of particular concern to habitat 3140 (Craig, et al., 2010).
On balance, and given that the hard water lakes of highest conservation value require oligotrophic conditions, the status of the structure and functions of habitat 3140 is assessed as declining.

Field label	Note
Habitat code: 3140	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. A number of important WFD measures are likely to contribute to the protection of and improvements in lakes with 3140, particularly national investment in municipal wastewater treatment and regulation of such discharges by the EPA, and the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS). These measures should, with time, lead to reductions in pollutant losses from municipal wastewaters and once-off houses. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. It must be recognised, however, that a very large number of DWWTS need to be inspected nationally and that this will take a significant amount of time. The current RBMP measures are likely to be insufficient to protect habitat 3140, however, for a number of reasons, most notably: 1. An objective of good status applies to all lakes not currently at high status (or 97% of the 78 3140 lakes monitored under the WFD, using the 'final ecological status' assigned by the EPA for the period 2007-2009). This will not allow for restoration of the habitat is sites where it requires high (or oligotrophic) status. 2. Some important hard water lakes are too small to be considered by the WFD, which focuses on lakes of 50 ha or more. While approximately 24% of the Irish EPA's WFD monitoring lakes are less than 50 ha in area, only 22 are smaller than 10 ha and, of those, only six are considered to have habitat 3140. 3. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status in areas of Ireland with high rainfall and/or organic soils. The effectiveness of the Nitrates Action Programme in protecting or improving water quality in karst catchments has yet to be demonstrated. Although, one such catchment is now subject to investigation as part of the Agricultural Catchments Programme. Given that the majority of phosphorus lost to waters has an agricultural origin, that agriculture accounts for 47% of polluted rivers sites overall (McGarrigle et al., 2010) and the detection of significant quantities of phosphorus in groundwater in karst aquifers (Craig et al., 2010), there is significant concern that the current agricultural measures may not succeed in preventing further deterioration of lake water quality. 4. To date, there has been little systematic effort to align the objectives of the different water body types. This is evidenced by the fact that groundwater trigger values and river water standards do not consider loading to downstream lakes. Given that effective measures for protection and restoration of hard water lakes will require control of loading from both inflowing rivers and groundwater, this is a cause for concern. 5. There are currently no RBMP measures to address drainage or other degradation of peatland and the resultant water quality problems. It is assumed, therefore, that current and future RBMP cycles will lead to a gradual reduction in pressures from DWWTS and municipal wastewaters. Unless an objective of high status is established for the relevant lakes with habitat 3140, however, the standards applied to such wastewaters may not be sufficiently

	stringent. It is likely that maintenance or restoration of habitat 3140 will require dedicated Sub-basin Management Plans with more stringent objectives and tailored measures to address catchment-specific pressures, particularly pollution of both surface and groundwater from agriculture, forestry and peat-cutting. As noted above, agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and current agricultural policy supports food production and land intensification. The recent state of the Environment reports states: “The development strategy for the agriculture sector, Food Harvest 2020 (DAFF, 2010) proposes a 50% increase in milk production by 2020. While environmental sustainability is a key underlying principle of Food Harvest 2020, the milk production targets will present a significant challenge to meeting WFD objectives.” (Lehane and O’Leary, 2012) Conservation actions to rehabilitate and restore blanket bogs and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some 3140 catchments. However, economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural reclamation of peat and peaty soils is ongoing in the west, in particular. These considerations combined with the current status of the habitat’s structure and functions, on-going pressures and the threats posed by climate change mean that the future prospects are considered bad.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	See 2.8.4 a). It would appear overall that without dedicated conservation programmes for the habitat, the pressures on habitat 3140 will most likely increase in the future.
2.8.05 Overall assessment of Conservation Status	The main problems for lake habitats in Ireland are damage through eutrophication and other processes linked to water pollution, rather than direct habitat loss and destruction. Consequently, the conservation status of the range and area of habitat 3140 were assessed as favourable. Detailed, dedicated surveillance of habitat 3140 was conducted at 28 sites in 2011 and 2012 and demonstrated that the greater part of the area of the habitat within Ireland is in poor or bad condition. WFD water quality data supported this finding, with an expert judgement led review of 2009-2011 data for 58 additional lakes with habitat 3140 demonstrating that 45% of lakes were in poor/inadequate condition and 40% in bad condition. Structure and functions were, as a result, assessed as bad and declining. The pressures and threats on habitat 3140 are indirect, arising within the catchments of the occupied lakes, and pollutants are transported via groundwater as well as surface water pathways. Nutrient and organic losses from agriculture and municipal and industrial discharges are the most significant pressures and threats for habitat 3140. While significant measures are being implemented to address pollution from regulated discharges and domestic wastewater systems, action to reduce losses from agriculture, the largest source of phosphorus to water, is considered inadequate and there are currently no measures to address the impacts of peatland drainage and general degradation. As a result, the future prospects for the habitat were also considered bad, declining.
2.8.06 Overall trend in Conservation Status	The overall trend is considered to be declining, given the status of the structure and functions and the prediction that pressures are most likely to increase on the habitat in the future.

Field label	Note
Habitat code: 3140	
3.1.02 Method used	The shapefile of lakes with habitat 3140 was intersected with the shapefile of the SAC network and all lakes occurring within the network selected. 130 of the 527 lakes assigned habitat 3140 were within the network. These totalled 413.8 km2 in area. In addition, a shapefile was created of the 5,463 lake segments not examined during the lake habitat assessments (2007-2012). This shapefile was intersected with the SAC network and 791 unexamined lakes with a total area of 13.9 km2 found within the network. Using the same correction factor (- 6.3%) and percentage area of lakes with habitat 3140 (45%) used in 2.4.1, the additional area of habitat 3140 within the network was estimated as 5.9 km2. Summing these two figures (413.8 km2 and 5.9 km2) gave a total area of 419.7 km2 of habitat 3140 within the network. The same method was used to estimate the area of the habitat within SAC selected for its protection (figure given in 2.7.5). 67 lakes with habitat 3140 totalling 30,322.9 ha or 303.2 km2 in area were found within the 18 SAC selected for the habitat. 162 unexamined segments, totalling 3.5 km2 were found within the 18 SAC. Therefore, 1.5 km2 of habitat 3140 was estimated to occur within the 18 SAC from the unexamined segments, bringing the total to 303.2 km2 plus 1.5 km2 or 304.7 km2.
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for habitat 3140 in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. There are, however, no conservation measures currently being undertaken to restore or enhance areas of 3140 habitat within SAC. The Programmes of Measures (Measure 4.1) under the WFD River Basin Management Plans will help improve water quality generally, however, their focus is on improvement of poor quality rather than maintenance or restoration of the highest quality.

Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (3140)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
18-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3150

NAME: Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	

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Dwyer, N. (2013) The Status of Ireland's Climate, 2012. EPA, Wexford.
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Heuff, H. (1984) The Vegetation of Irish Lakes. Parts 1 and 2. Unpublished Report to the Wildlife Service, Office of Public Works, Dublin.
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standing waters in Britain: applications for conservation and monitoring. Aquatic conservation: Marine and Freshwater Ecosystems 2: 125-143.
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Roden, C.M. (1999) A survey of the sublittoral vegetation of 15 machair loughs in north west Ireland. Report to the National Heritage Council, Kilkenny.
Tierney, D., Free, G, Kennedy, B., Little, R., Plant, C., Trodd, W. and Wynne, C. (2010) Water Quality of Lakes. In: M. McGarrigle, J. Lucey, and M. Ó Cinnéide (eds.) Water Quality in Ireland 2007-2009. EPA, Wexford.
Webb, D. A., Parnell, J. and Doogue, D. (1996) An Irish flora. 7th ed. Dundalk: Dundalgan Press.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	11100	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	11100
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool, and modified to remove 10 km squares that do not contain habitat 3150, is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. The FRR was reported as unknown in 2007. The current range and FRR reported here represent an improvement on the 2007 assessment, as: 1. they are based on a better understanding of the habitat, 2. they are based on mapping of the habitat's distribution using biological, geological, physico-chemical and other relevant data, rather than the distribution of the SAC selected for 3150, as was done in 2007, 3. turloughs, lagoons and other non-lake segments have been removed from the distribution data, and 4. lake segments of less than one hectare in area have been removed unless site-specific information identified the presence of the habitat. It should be noted that Range is likely to be an insensitive measure for the conservation status of lake habitats. Lakes can be 'created' by the damming of rivers and while their area can be reduced through drainage or processes of natural succession, they are unlikely to be destroyed. In a temperate, oceanic climate such as that of Ireland, it is unlikely that the range of habitat 3150 will ever change. The quality of the habitat (structures and functions) may deteriorate significantly and this is the key measure of the

	conservation status of the habitat. It is assumed throughout this assessment that restoration of habitat 3150 is possible regardless of the severity of the deterioration in habitat quality.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	411.1		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period	1989-2012		
2.4.9 Long-term trend direction	stable (0)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		

2.4.12 Favourable reference area	area (km)	411.1
	operator	N/A
	unknown	No
	method	The current surface area was derived by summing the lake surface areas and is considered to be the Favourable Reference Area (FRA), as there is no evidence of a decline since the Directive came into force. No FRA was reported in 2007.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	low importance (L)	N/A
diffuse pollution to surface waters via storm overflows or urban run-off (H01.04)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
other major surface water abstractions (J02.06.10)	low importance (L)	N/A
surface water abstractions for agriculture (J02.06.01)	low importance (L)	N/A
mechanical removal of peat (C01.03.02)	low importance (L)	Mixed pollutants (X)
invasive non-native species (I01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	low importance (L)	N/A
diffuse pollution to surface waters via storm overflows or urban run-off (H01.04)	low importance (L)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
other major surface water abstractions (J02.06.10)	low importance (L)	N/A
surface water abstractions for agriculture (J02.06.01)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
mechanical removal of peat (C01.03.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Callitriche spp.

Ceratophyllum demersum

Chara spp.

Hippuris vulgaris

Lemna gibba

Lemna minor

Lemna trisulca

Myriophyllum spicatum

Nuphar lutea

Potamogeton berchtoldii

Potamogeton filiformis

Potamogeton friesii

Potamogeton gramineus

Potamogeton lucens

Potamogeton natans

Potamogeton obtusifolius

Potamogeton pectinatus

Potamogeton perfoliatus

Potamogeton praelongus
Potamogeton pusillus
Potamogeton ziziii
Sagittaria sagittifolia
Sparganium emersum
Spirodela polyrhiza

2.7.2 Species method used	Expert judgement together with EPA macrophyte raw data from routine Water Framework Directive monitoring (2007-2012) were used to determine the status of typical species as part of the overall assessment of the structure and functions.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Range and Area are likely to be insensitive measures for the conservation status of lake habitats and are unlikely to change significantly between reporting periods. The quality of the habitat (structures and functions) is the key measure of the current conservation status of the habitat. The structure and functions assessment, combined with information on pressures and their associated drivers, determine the future prospects assessment. Further research is required to develop reliable and robust methods for assessing the condition of structure and functions of habitat 3150 at site level. An estimated 14.3 km2 of lake area was considered to have habitat 3150 within the nine SAC where habitat 3150 is a qualifying interest for the site.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	19.6	max	19.6
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Enhance Long term

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 3150	
0.2 Habitat code	Habitat 3150, Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation occurs in lowland, base-rich lakes in the midlands and north east of Ireland. Here it is 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 frequently co-occur, including, Myriophyllum spicatum, Hippuris vulgaris, Callitriche spp., Sagittaria sagittifolia and Ceratophyllum demersum, while free-floating species such Lemna trisulca are also common. The habitat is generally associated with large lakes, such as those of the Shannon system, and with small, but naturally 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 name of this habitat (“eutrophic”) has caused some confusion and discomfiture with freshwater ecologists specialising in water quality. Ireland does not have significant phosphorus-rich deposits, hence there are few, if any, lakes that can be characterised as naturally “eutrophic” in line with the standard OECD approach of using total phosphorus and chlorophyll a concentrations, and water transparency (OECD, 1982). It is possible that naturally eutrophic conditions do exist in some coastal freshwater lakes (these could perhaps be considered the ‘freshwater extreme’ of the coastal lagoon habitat), however such sites require further investigation. While further study of the habitat is required, it seems certain that the pondweed-rich variant found in Ireland requires mesotrophic waters, as defined by the OECD methods. 3150 lakes typically have well-developed reedswamp, fen and/or marsh communities around much of their shoreline. Wet woodland would have surrounded much of their shoreline 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 soils and, hence, some of the most intensive agricultural lands in Ireland. Consequently, the habitat has been under significant pressure from eutrophication since the 1970s or before.
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

Field label	Note
Habitat code: 3150	
1.1.02 Method used - map	The distribution of habitat 3150 in Ireland was based on mapped lakes. The "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 12,217 separate polygons. A number of rules were applied during the process of assigning habitat 3150 to these polygons, in summary: 1. Polygons for the priority habitat coastal lagoons (habitat code 1150) were removed from the dataset. 2. Habitat 3150 was not assigned to any segments of less than 1 ha in area unless site-specific data or knowledge existed to demonstrate its presence. Lake habitats do not generally develop in waterbodies of less than 6 ha, so the 1 ha rule may overestimate the area of habitat 3150 in Ireland. 3. Habitat 3150 was assigned to lakes that also contain habitats 3130 (Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea), and 3140 (Hard oligo-mesotrophic waters with benthic vegetation of Chara spp). 4. Habitat 3150 also co-occurs with the priority habitat turloughs (3180) at a small number of sites. 5. The Natura forms, explanatory notes and site synopsis for the nine SAC selected for the protection of habitat 3150 were used to identify lakes where the habitat occurs. Data on vegetation communities from Heuff (1984) were also used to identify lakes with habitat 3150. 6. EPA data on aquatic macrophytes were also used to identify lakes with habitat 3150. 7. Geological data, topography, altitude (low-lying lakes only), physico-chemical data, satellite imagery and orthophotography were used, in combination with expert judgement, to identify lakes with 3150 for which no macrophyte data were available. Confidence is low in the classification of lakes using expert judgement. 8. The full distribution of habitat 3150 was reviewed and corrections made as necessary. The full distribution mapping process is detailed in Appendix II of the lake habitat backing document (O Connor, 2013b). This process resulted in a map of the lakes in which habitat 3150 occurs. Of the 3,719 lakes with an area of greater than 1 ha in the national dataset, 2,505 were examined and 499 were classified as having habitat 3150. 75 lakes of less than 1 ha in area were also classified as having habitat 3150. The distribution of the habitat was based on these 574 lake segments. The 574 lake segments with habitat 3150 were intersected with the Irish National 10 km Grid, producing a distribution of 88 10 km squares. The habitat was distributed across 574 lakes in 14 counties (Cavan, Clare, Galway, Leitrim, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Roscommon, Sligo, Tipperary and Westmeath). It must be stated that habitat 3150 was assigned to the majority of the 574 lakes using geological and other mapping data. The confidence in the distribution is, as a result, low. Field survey is necessary to confirm the habitat's distribution and to improve understanding of its natural, ecological variation and the impacts that result from anthropogenic pressures. The rules adopted for distribution mapping differed from those used in 2007 in a number of respects, most significantly in that, in 2007: 1. No lake polygons were classified as having lake habitat 3150. 2. Only one lake habitat was assigned to each lake, however the authors did not distinguish habitats 3110 and 3130. 2. A lake habitat was assigned to 11,924 WFD lake polygons from the 2007 dataset, including ponds of < 1 ha in area, coastal lagoons and turloughs. For this

	assessment (2013), lake habitats were assigned only to segments that were examined as detailed above. Lake habitats were not assigned to 476 segments (or 7.1% of the polygons examined, by number) because they were found to be turloughs, lagoons, artificial ornamental ponds, mill ponds, reservoirs, fens, bogs, quarry ponds, mine tailings or other (often non-wetland) features. In 2007, the range of this habitat was based on the distribution of SAC designated for its protection and the surface are of the range was reported as 3,900 km2. The distribution and range reported here are, therefore, a significant improvement on those reported in 2007.
1.1.03 Year or period	The distribution was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs. Macrophyte data used were of various ages, but principally date from the period 2001-2012.
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps using the recommended Range Tool. The resultant range was reviewed, and eight 10 km squares were removed as the habitat is known not to occur within them, owing to the geology, soils and known occurrence of other standing water habitat within the lakes.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressure and threats.
2.3.02 Method used - Range	See 1.1.2, 1.1.4 and 1.1.5 above, and O Connor (2013b) for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.04 Short term trend - Trend direction	There is no evidence of a decline in the range of habitat 3150. Lake habitats suffer damage as a result of eutrophication and other water quality problems, but are seldom destroyed. The result is that the range of lake habitats remains stable.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.09 a) Favourable reference range - In km2	As there is no evidence of a decline in range since the Directive came into force, the area of the range is large at approximately 13% of the terrestrial grid and the habitat is widespread (covering 14 counties), it can be assumed that the current range is large enough to allow the long-term survival of the habitat. As a result, the current range is set as the Favourable Reference Range.
2.3.10 a) Reason for change - genuine change?	There has been no genuine change in the range of lake habitat 3150.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	A re-interpretation of the habitat, using available data and reports for Ireland and Great Britain, has improved the knowledge of its distribution (see O Connor (2013b) for further information). Routine Water Framework Directive monitoring by the Irish EPA of lake macrophytes at more than 220 lakes has significantly increased the available data on Irish lake habitats. In addition, this assessment made greater use of older studies on lake vegetation and of accounts of the ecologies of aquatic macrophytes (e.g. Heuff, 1984, Roden, 1999, Preston, 1995, Preston and Croft, 2001).

Field label	Note
Habitat code: 3150	
2.3.10 c) Reason for change - use of different method	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of a different approach to mapping the distribution of the habitat and the new range tool. The main reason for the change in the range was the different approach taken to mapping the habitat's distribution. This is described in sections 1.1.2 and 2.3.9 d) above, and in greater detail in O Connor (2013b). In 2007, the distribution of habitat 3150 was based on the distribution of the SAC selected for its protection. The authors of the 2007 assessment interpreted the habitat in line with the OECD definition of 'eutrophic', rather than its macrophyte species' composition, and did not assign habitat 3150 to any lakes outside of the SAC selected for 3150. As a result, many lakes containing habitat 3150 were omitted from the distribution in 2007. The co-occurrence of habitat 3150 with habitats 3130, 3140 and 3180 was not recognised in 2007, as a 'one lake, one Annex I habitat' rule was adopted. The recommended Range Tool was used and this has been demonstrated to produce a significantly larger range to method of range mapping used in 2007 (see O Connor, 2013a).
2.4.01 Surface area	The surface area of the habitat was based on the surface area of the lakes containing the habitat. A two-step process was adopted. Firstly, the area of all 574 lake segments identified as containing habitat 3150 was summed (see 1.1.2 and O Connor (2013b) for further information on 3150 lake distribution). The summed lake surface areas came to 38,134.09 ha or 381.3 km2. Secondly, it was assumed that some of the 5,463 lake segments that were not examined also contain habitat 3150. Owing to the significant number of errors identified in the national dataset, a correction factor was generated (see O Connor, 2013b for further information on errors). This was based on the percentage area of lake segments examined to which no lake habitat was assigned. The total area of the 476 unassigned polygons was 7,646 ha. This represents 6.3% of the total area (121,971 ha) of the 6,669 polygons examined. The total area of the 5,463 lake segments that were not examined was 96.5 km2. This was reduced by 6.3% to 90.4 km2, to take account of the errors in the dataset. The total area of the 6,193 lake segments to which one or more of the lake habitats was assigned was 1,143.2 km2. 381.3 km2 or 33% of this area was assigned to 3150. 33% of 90.4 km2 is 29.8 km2. The two figures (381.3 km2 and 29.8 km2) were summed to give 411.1 km2. As some lakes can contain more than one Annex I standing water habitat (habitat 3150 co-occurs with habitats 3130, 3140 and 3180), this figure is a significant overestimate of the actual area of the habitat. Even where habitat 3150 is the only lake habitat occurring, it is unlikely to cover an area equivalent to the surface area of the lake. Accurate mapping of submerged macrophyte communities is challenging and time-consuming, so that lake surface area is likely to remain the only available indicator of habitat area into the future.
2.4.02 Year or period	The surface area was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.

Field label	Note
Habitat code: 3150	
2.4.12 a) Favourable reference area - In km2	As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 33% of the total area of waterbodies with lake habitats (3110, 3130, 3140, 3150, 3160), it can be assumed that the current area is large enough to allow the long-term survival of the habitat. As a result, the surface area is set as the Favourable Reference Area. As with Range, area is likely to be an insensitive measure for the conservation status of lake habitats. It is unlikely that any significant increases or decreases in lake surface area will occur in Ireland and, hence, the conservation status of both area and range will remain favourable. Habitat quality (structures and functions) is, therefore, the key measure of the conservation status of lake habitats.
2.4.13 a) Reason for change - genuine change?	There has been no genuine change in the area of lake habitat 3150.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	See 2.3.10 b) which describes the improved knowledge used in this assessment.
2.4.13 c) Reason for change - use of different method	The main reason for the change in the area of 3150 was the different approach taken to mapping the habitat's distribution. This is described in section 1.1.2 and 2.3.10 c) above and in greater detail in O Connor (2013b). The area of habitat 3150 was reported in 2007 as 401 km2. This figure was based on the surface area of lake segments within the boundaries of the nine SAC selected for habitat 3150. The similarity of the two figures (401 and 411.1 km2) is unexpected given the significant differences in the distributions on which they were based.

Field label	Note
Habitat code: 3150	
2.5 Main pressures	The pressures impacting on habitat 3150 are indirect, arising within the catchments of the occupied lakes, and can be broadly categorised into pollution and hydrological change. Direct impacts on the habitat have not been documented in Ireland, however, it is possible that some invasive species are having direct impacts. The main threats to lakes with habitat 3150 come from eutrophication resulting from diffuse and point losses of nutrients. Information on pressures on general water quality, and expert judgement were used to determine the pressures on lake habitat 3150. The main information sources were: 1. Water Framework Directive Reports (River Basin Management Plans, associated Water Management Unit Action Plans (http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%20 2009%20-%202015/) and the 2005 Article 5 Report (http://www.wfdireland.net/wfd-charreport.html)). 2. National Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, EPA, 2008, http://testweb.epa.ie/irelandsenvironment/). The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on habitat 3150. The pressures identified, listed in an approximate order of importance, were: 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. H01.01, pollution to surface waters by industrial plants, High importance 3. H01.03, other point source pollution to surface water, Medium importance 4. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, Medium importance 5. H01.09, diffuse pollution to surface waters due to other sources not listed, Medium importance 6. J02.07, Water abstractions from groundwater, Low importance (= land drainage in the catchment) 7. H01.04, diffuse pollution to surface waters via storm overflows or urban run-off, Low importance 8. J02.06.02, surface water abstractions for public water supply, Low importance 9. J02.06.10, other major surface water abstractions, Low importance 10. J02.06.01, surface water abstractions for agriculture, Low importance 11. C01.03.02 X, mechanical removal of peat, Low importance 12. I01, invasive non-native species, Low importance Codes H01.09 and J02.07 were used to indicate pollution and hydrological pressures arising from land drainage in the lake's catchment. Other codes could have been used, e.g. J02.05 'Modification of hydrographic functioning, general. Areas of wetland and other terrestrial habitats are frequently drained in Ireland for purposes such as development, agriculture, forestry and peat-cutting. Pollution qualifiers were not used, with the exception of C01.03.02. Most of the pressures listed result in increased nutrient loads and eutrophication. Hydrological change, increased sediment loads (leading to sedimentation and turbidity), increased organic carbon loads, increased water colour and acidification are other likely impacts. Zebra mussels were recorded at 39 of the 62 monitored lakes, however as the impacts of zebra mussels on habitat 3150 are not known, they have been given low importance. Given that zebra mussels can increase water clarity, their presence could improve the condition of habitat 3150 in those lakes that are impacted by eutrophication. Alternatively, the increased enrichment of the benthos by zebra mussels could negatively impact habitat 3150 by reducing species diversity.

	Further information on how the pressures can impact on habitat 3130 is given in O Connor (2013 a and b).
2.5.01 Method used - pressures	Information on pressures on general water quality and expert judgement were used to determine the pressures on lake habitat 3150. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.6 Main threats	All pressures documented at 2.5 were also listed as threats. In addition, climate change was identified as a threat. The potential impacts of climate change on lake habitat 3150 are described in O Connor (2013 a and b), but are mainly linked to increased abstraction pressures.
2.6.01 Method used - Threats	Information on pressures on general water quality and expert judgement were used to determine the threats on lake habitat 3150. Water Framework Directive data and general water/environmental quality information were important. See 2.5 for further information.
2.7 Complementary information	The interpretation manual of EU habitats lists plant species associated with habitat 3150 (CEC, 2007). This list was reviewed against available publications on lake macrophyte communities in Ireland (Heuff, 1984, Free et al., 2006, 2009) and Great Britain (Palmer 1989, 1992, Palmer et al., 1992, Duigan et al., 2006) and, in particular, publications on aquatic macrophyte species (Preston, 1995, Preston and Croft, 2001). EPA macrophyte raw data from routine Water Framework Directive monitoring (2001-2012) were also reviewed. Habitat 3150 is notable for the abundance and diversity of pondweeds, particularly the broad-leaved species and many of their hybrids. This review produced th list of typical species. The non-native, Elodea canadensis is also frequent in habitat 3150. 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.

Field label	Note
Habitat code: 3150	
2.7.04 Structure and functions - Methods used	2 = Estimate based on partial data with some extrapolation and/or modelling 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 yet been developed. As noted in 0.2, it is assumed here that the pondweed-rich variant of habitat 3150 native to Ireland is associated with naturally mesotrophic waters as defined by the standard OECD approach (OECD, 1982). The approach to assessing structure and functions was, therefore, to examine water quality data for lakes with habitat 3150. A target of mesotrophic or better was used, however, it must be acknowledged that the habitat may be tolerant of some degree of eutrophication. Research is required to establish 3150-specific water quality targets. Significant quantities of data on the general environmental and ecological status of Irish lakes are available through the Water Framework Directive (WFD). The Irish EPA is responsible for co-ordinating the WFD monitoring programme, for monitoring the lake biological quality elements (other than fish, which are monitored by Inland Fisheries Ireland) and for reporting on ecological status. The lake monitoring programme follows a three-year-cycle. EPA lake ecological status data for the years 2009-2011 inclusive were used to assess the quality of habitat 3150. 2009-2011 ecological status data were available for 62 or 11% of the 574 lakes mapped as having habitat 3150. Most of the lake indicators developed for WFD purposes (known as 'metrics' for the 'quality elements' specified in Annex V of the WFD) assess eutrophication impacts, notably: 1. Chlorophyll a status 2. Nutrient condition status 3. Macrophyte status 4. Phytobenthos status 5. Phytoplankton composition status These quality elements, as well as acidification/alkalisation, were used to assess the conservation condition of the structures and functions of the 62 monitored lakes with habitat 3150. Final ecological status (2009-2011) was not used as it incorporates fish status and it is unlikely there is a correlation between fish status and the status of habitat 3150. Final ecological status also incorporates information on the occurrence of alien invasive species; zebra mussels and roach. Alien invasive species are here considered potential pressures on habitat 3150. Their presence alone is not, however, considered sufficient to warrant a change in structure and functions condition from good to poor. As for other pressures, such as eutrophication and acidification, any impact of alien invasive species should be detected through appropriate biological and physico-chemical monitoring. WFD high status reflects oligotrophic conditions (as defined by the standard OECD approach incorporating data on chlorophyll a and total phosphorus concentrations), while WFD good status reflects mesotrophic conditions. As noted above and in 0.2, the interpretation of habitat 3150 used here assumes mesotrophic conditions are required and a target of 'good status' was, therefore, adopted. The status of each of the listed quality elements was examined for the monitored lakes with habitat 3150. High or good status was considered equivalent to favourable/good conservation condition, 'moderate' status equivalent to poor conservation condition, while 'poor' or 'bad' status was considered equivalent to bad conservation condition. As acidification/alkalisation status is defined as either 'high' or 'moderate', a target of high status was used. For the structure and functions to be considered to be in favourable condition, all six elements must reach at least good status. This use of the lowest common denominator of

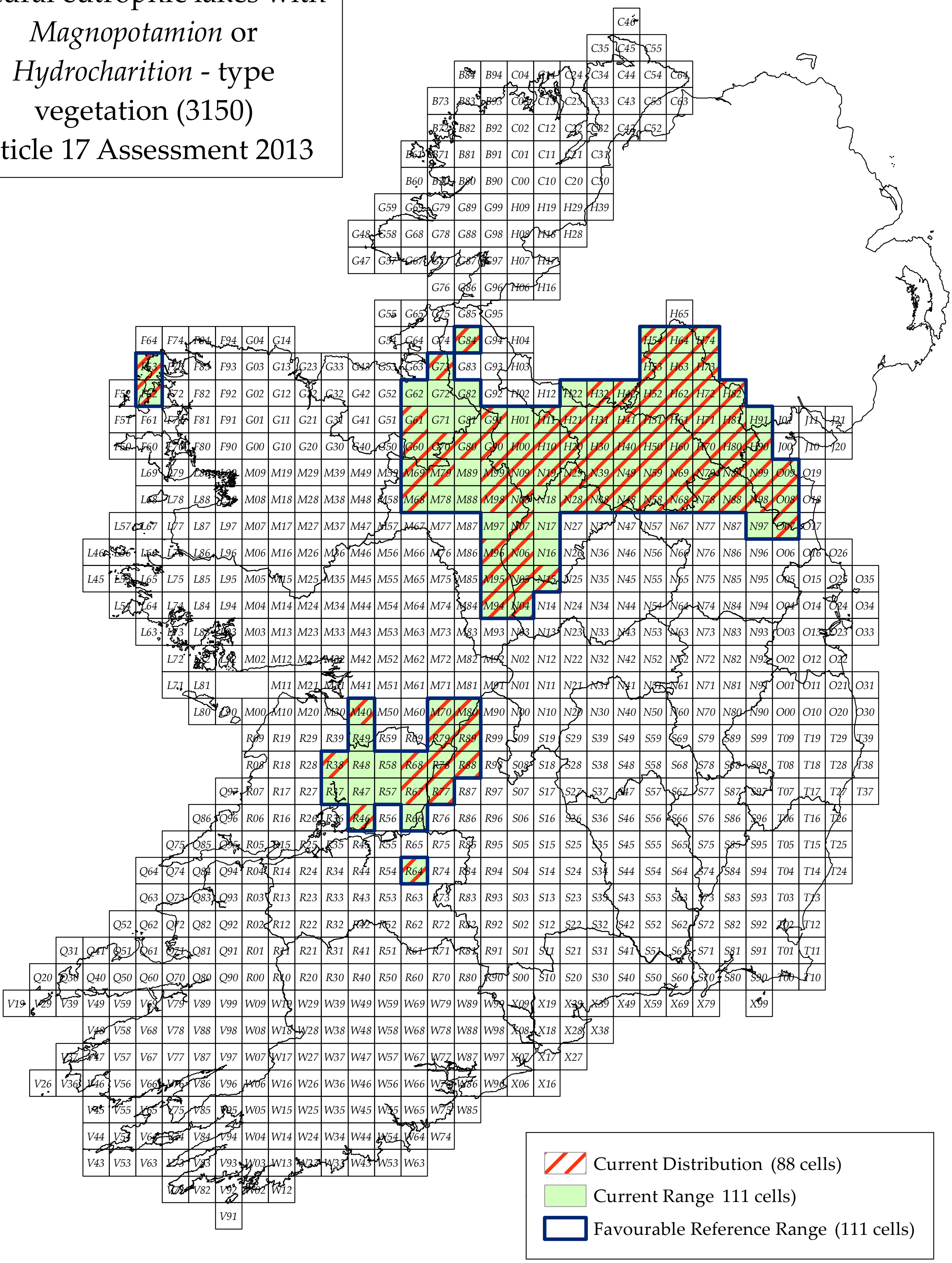
Field label	Note
	the six quality elements is in keeping with final ecological status classification under the WFD, which is derived by taking the lowest status classes for the full range of specified biological, physico-chemical and hydromorphological quality elements (Tierney, et al. 2010). The conservation condition (using the Habitats Directive terms 'good', 'poor' (or inadequate) and 'bad'), as converted from the WFD status, for the monitored lakes with 3150 for the period 2009-2011 was as follows: 1. Chlorophyll a status – 53% of the 61 monitored lakes in good conservation condition (i.e. high and good status under the WFD), 26% at poor (inadequate) conservation condition and 21% at bad conservation condition. 2. Nutrient condition status – 27% of the 62 monitored lakes in good condition, 73% in poor and 30% in bad. 3. Macrophyte status – 20% of the 61 monitored lakes in good condition, 47% at poor and 33% at bad. 4. Phytobenthos status – 53% of the 15 monitored lakes at good condition, 47 % in poor and 0% in bad. 5. Phytoplankton composition status – 33.3% of the 15 monitored lakes at good condition, 53.3% in poor and 13.3% in bad. 6. Acidification/alkalisation status – 85% of 62 monitored lakes in good condition, 15% in poor. 7. Final conservation condition – 8% (or five) of the 62 monitored lakes were in good condition, 52% (or 32) were in poor condition and 40% (or 25) were in bad condition. It is worthy of note that had the final ecological status (2009-2011) been used, 7% of the lakes would have reached good condition, 45% poor and 48% bad. The result of the structure and functions assessment using WFD data indicates that 52% of lakes monitored were in poor condition and 40% were in bad condition, suggesting that the national status of the structure and functions of habitat 3150 is bad. However, given: 1) the low confidence in the mapped distribution of the habitat (see 1.1.2), 2) that the pre-Water Framework Directive focus of lake monitoring on lakes with perceived water quality problems is likely to skew this relatively small sample (11%) towards the more impacted lakes, 3) that there is uncertainty as to the applicability of the more recently developed WFD tools to assessing the condition of habitat 3150 (macrophyte, phytobenthos and phytoplankton composition tools), 4) that there is uncertainty around the use of the good status target, and 5), that 3150 is likely to be tolerant of a degree of enrichment, it is considered necessary to treat these results with significant caution. Consequently, using WFD status data and expert judgement, the national status of the structure and functions of habitat 3150 was assessed as inadequate. It should be noted, however, that the high percentage of monitored sites at moderate nutrient condition status (73%) highlights, again, that eutrophication is the most significant impact in lakes with 3150. It is recommended that there should be further investigation into the use of the EPA WFD macrophyte metric (the 'Free Index') for assessing the condition of the structure and functions of habitat 3150. It is thought likely that this metric, or the raw data it uses, could be adapted for habitat 3150.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the habitat is concentrated in the Shannon catchment and drumlin belt of Cavan, Monaghan and Leitrim. 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 13% of the terrestrial grid, the range is considered to be favourable.

Field label	Note
Habitat code: 3150	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The estimated area of the habitat is 411.1 km2. As there is no evidence of a decline in area since the Directive came into force and the area is large at approximately 33% of the total area with lake habitats (3110, 3130, 3140, 3150, 3160), the area is considered to be favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although there has been no dedicated monitoring of habitat 3150 during the period, detailed biological and physico-chemical data are available for 62 (or 11%) of lakes with habitat 3150. Using these WFD data and expert judgement, the national status of the structure and functions of habitat 3150 was assessed as inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Tierney et al. (2010) illustrated the long-term trend in trophic status in Irish lakes, expressed in accordance with the areas of monitored lakes. The authors stated that 'the percentage of lake area in each trophic category has remained relatively stable since 1998, based on the modified OECD scheme' suggesting that the short-term trend in lake habitat quality generally is stable. The EPA and local authorities have examined and reported on chlorophyll a in twenty-two lakes continuously in each three-year water quality review period since 1976, and a further five lakes have continuous data since 1982. This dataset was examined for general chlorophyll a trends in oligotrophic and mesotrophic lakes (see Najas flexilis backing document for further information, O Connor, 2013a). While no clear trend emerged for the 14 lakes examined, the overall impression was of stable or even decreasing chlorophyll a concentrations. The presence of zebra mussels in eight of the 14 lakes, however, may have masked increases in productivity. Given the general stable trend in oligotrophic and mesotrophic lakes, the trend in the Structure and Functions of habitat 3130 is considered to be stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. The objectives of the current River Basin Management Plans (RBMPs) are considered to be in line with the requirements of habitat 3150. The measures implemented under the current and future RBMPs will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements may not become apparent in the short-term. All WFD measures should contribute to the protection of and improvements in lakes with 3150, particularly national investment in municipal wastewater treatment and regulation of such discharges by the EPA. The National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS) is also considered to be a key measure for habitat 3150. These measures should, with time, lead to reductions in pollutant losses from municipal wastewaters and once-off houses. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. However, agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and existing agricultural policy supports food production and land intensification. Furthermore, there are significant concerns as to the effectiveness of the RBMP measures for agriculture, which are currently restricted to implementation of the Nitrates Action Programme. Given the unfavourable inadequate status of the habitat's structure and functions and the pressures and threats identified, the future prospects are assessed as unfavourable inadequate.

Field label	Note
Habitat code: 3150	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Measures to reduce pollution from municipal and industrial wastewaters, as well as the National Inspection Plan for domestic wastewater treatment systems are expected to lead to significant reductions in nutrient losses from these sources. The works involved in the implementation of these measures are likely, however, to result in a time delay before improvements become evident. As agriculture continues to export the majority of phosphorus to surface waters and the RBMP measures for agriculture are considered insufficient, however, the reduced losses from domestic, municipal and industrial wastewaters are likely to be counteracted by continuing and, possibly increasing, losses from agriculture. On balance, the future prospects of habitat 3150 are considered to be stable.
2.8.05 Overall assessment of Conservation Status	The main problems for lake habitats in Ireland are damage through eutrophication and other processes linked to water pollution and hydrological change, rather than habitat loss and destruction. Consequently, the conservation status of the range and area of habitat 3150 were assessed as favourable. No dedicated surveillance of habitat 3150 has been conducted and WFD water quality data were used to assess the status of the habitat's structure and functions. An expert judgement led review of the data for 62 lakes with habitat 3150 concluded that structure and functions are currently inadequate, but stable. The pressures and threats on habitat 3150 are indirect, arising within the catchments of the occupied lakes. While significant measures are being implemented to address pollution from industry and other wastewaters, action to reduce losses from agriculture, the largest source of phosphorus to water, is considered insufficient and, as a result, the future prospects for the habitat were also considered inadequate, stable. The overall conservation status of lake habitat 3150 is assessed as unfavourable inadequate.
2.8.06 Overall trend in Conservation Status	Given that the trends for structure and functions and future prospects were assessed as stable, the overall trend is considered to be stable.
3.1.02 Method used	The shapefile of lakes with habitat 3150 was intersected with the shapefile of the SAC network and all lakes occurring within the network selected. 89 of the 574 lakes assigned habitat 3150 were within the network. These totalled 15.3 km2 in area. In addition, a shapefile was created of the 5,463 lake segments not examined during the lake habitat assessments (2007-2012). This shapefile was intersected with the SAC network and 791 unexamined lakes with a total area of 13.9 km2 found within the network. Using the same correction factor (- 6.3%) and percentage area of lakes with habitat 3150 (33%) used in 2.4.1, the additional area of habitat 3110 within the network was estimated as 4.3 km2. Summing these two figures (15.3 km2 and 4.3 km2) gave a total area of 19.6 km2 of habitat 3150 within the network. The same method was used to estimate the area of the habitat within SAC selected for its protection (figure given in 2.7.5). 85 lakes with habitat 3150 13.9 km2 in area were found within the nine SAC selected for the habitat. 26 unexamined segments totalling 1.2 km2 were found within the nine SAC. Therefore, 0.4 km2 of habitat 3150 was estimated to occur within the nine SAC from the unexamined segments, bringing the total to 13.9 km2 plus 0.4 km2 or 14.3 km2.
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.

Field label	Note
Habitat code: 3150	
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for habitat 3150 in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment through Article 6 (3). The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. There are, however, no conservation measures currently being undertaken to restore or enhance areas of 3150 habitat within SAC. More detailed surveillance of the habitat would be required before such measures could be planned. The Programmes of Measures (Measure 4.1) under the WFD River Basin Management Plans will help improve water quality and protect habitat 3150.

Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation (3150) Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta

Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3160

NAME: Natural dystrophic lakes and ponds

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region **Atlantic (ATL)**

2.2 Published

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McGarrigle, M.L., Bowman, J.J., Clabby, K.J., Lucey, J., Cunningham, P., MacCarthaigh, M., Keegan, M., Cantrell, B., Lehane, M., Clenaghan, C. and Toner, P.F. (2002) Water Quality in Ireland 1998-2000. EPA, Wexford.
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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	18300	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	18300
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. This is smaller than the FRR set in 2007 (71,700 km2) owing to the improved method of mapping the habitat's distribution. The main reasons for the reduction were: 1. a better understanding of the habitat, 2. the close examination of lake segments, blanket peat soils, orthophotographs and other data to identify lakes and ponds with the dystrophic habitat, 3. the recognition that the dystrophic habitat can co-occur with habitat 3110. It should be noted that Range is likely to be an insensitive measure for the conservation status of habitat 3160. While dystrophic lakes and ponds can be destroyed by drainage of peatland, it is unlikely that such losses would occur on a scale that results in a significant change in the habitat's range. Surveillance of the area of the habitat is desirable, but it is likely to be difficult to accurately measure the changes and the quality of the habitat (structures and functions) is considered to be the key measure of the conservation status of the habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	32.1		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period	1989-2012		
2.4.9 Long-term trend direction	decrease (-)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		

2.4.12 Favourable reference area	area (km)	32.1
	operator	N/A
	unknown	No
	method	The current surface area was derived by summing the lake surface areas and is considered to be the Favourable Reference Area (FRA), as there is no evidence of a decline since the Directive came into force. No FRA was set in 2007, so this is a marked improvement on the last conservation assessment.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	Mixed pollutants (X)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species
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
Alona affinis
Alona costata
Alona rustica
Alonella excisa
Alonella nana
Alonopsis elongata
Camptocercus rectirostris
Chydorus sphaericus
Eurycercus lamellatus
Pleuroxus truncatus
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

2.7.2 Species method used	Expert judgement together with the data sources listed in 2.2 were used to determine the status of typical species as part of the overall assessment of the structure and functions.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	2,143 dystrophic lakes and ponds, totalling 10.4 km2 in area were found within the ten SAC where habitat 3160 is a qualifying interest for the site.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	14.2	max	14.2
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving the hydrological regime (4.2)	One-off	medium importance (M)	Outside	Enhance Long term

Field label	Note
Habitat code: 3160	
0.2 Habitat code	Dystrophic lakes and ponds are mainly associated with areas of Atlantic and upland blanket bog, and wet heath. As for other ombrotrophic bog habitats, the habitat is species poor botanically, but has relatively greater invertebrate species richness. Low species richness is, however, not synonymous with low conservation value, as many of the species are strongly associated with and sometimes restricted to the dystrophic habitat. Dystrophic lakes and ponds are variable across their Irish range, with altitude, geology, and distance from the sea the most likely drivers of the variation (van Groenendael et al., 1979, Drinan, 2012). While individual sites are typically species poor, among-site variation means that the habitat displays higher species richness at landscape and regional scales. Furthermore, the invertebrate fauna is characterised by some rare and threatened species, such as the endangered downy emerald dragonfly (Drinan et al., 2011). In terms of macroinvertebrate species richness, dystrophic lakes and ponds are dominated by Coleoptera (water beetles), followed by Trichoptera (caddisfly larvae) and Heteroptera (aquatic bugs, such as water boatmen) (Drinan, 2012).
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

Field label	Note
Habitat code: 3160	
1.1.02 Method used - map	The distribution of habitat 3160 in Ireland was based on mapped lakes and ponds. The "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 12,217 separate polygons. A number of rules were applied during the process of assigning habitat 3160 to these polygons, in summary: 1. Polygons for the priority habitat coastal lagoons (habitat code 1150) were removed from the dataset. 2. Habitat 3160 was not assigned to any turlough polygons (priority habitat 3180). 3. Habitat 3160 was assigned to lakes that also contain habitat 3110 (Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)). 4. Expert knowledge was used to assign habitat 3160 to lake segments in blanket bog and upland areas known to have well-developed dystrophic pool and lake systems. These decisions were also informed by OSi 2005 orthophotographs and bedrock geology. 5. All areas of blanket peat (BkPt) mapped in the Teagasc, GSI and EPA soils shapefile and all SAC selected for habitat 3160 were also examined, with habitat 3160 assigned as appropriate. 6. In general, habitat 3160 was assigned to all waterbodies of less than one hectare in areas of blanket peat and high altitude. In areas of base-poor geology with deep peat and/or altitudes of greater than 400 metres, the habitat was also assigned to larger lake segments. 7. Aquatic macrophyte data were used to verify 3160 lakes and ponds (EPA Macrophyte raw data, Free et al., 2006, 2009, Heuff, 1984), although these were limited to a small number of sites. 8. The full distribution of habitat 3160 was reviewed and corrections made as necessary. The full distribution mapping process is detailed in Appendix II of the lake habitat backing document (O Connor, 2013b). This process resulted in a map of the lakes in which habitat 3160 occurs. Of the more than 12,000 lakes in the national dataset, 6,669 were examined and 4,274 were classified as having habitat 3160. 3,888 segments assigned habitat 3160 were less than 1 ha in area and 386 greater than 1 ha. The distribution of the habitat was based on these 4,274 lake segments. The 4,274 lake segments with habitat 3160 were intersected with the Irish National 10 km Grid, producing a distribution of 130 10 km squares. The habitat was distributed across 12 counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Louth, Mayo, Sligo, Waterford and Wicklow). In 2007, the distribution of habitat 3160 was based on distribution data for raised and blanket bog habitats (including degraded raised bog). These bog distribution data came from the 2007 conservation assessment of raised and blanket bog habitats, were most likely on a 10 km square grid level and resulted in an indicative distribution for habitat 3160 of 627 10 km squares (or 62,700 km2 and more than 70% of the terrestrial grid). The 2007 3160 distribution included a large number of 10 km squares with little, if any bog or upland, as well as all of the central limestone plain and the Burren, and was clearly a significant over-estimate. The distribution reported here (130 10 km squares) is considered more accurate and a significant improvement on the 2007 report.
1.1.03 Year or period	The distribution was based on the "WFD_LakeSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs. Macrophyte data used were of various ages, but principally dated from the period 2001-2012.

Field label	Note
Habitat code: 3160	
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps using the recommended Range Tool.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressure and threats.
2.3.02 Method used - Range	See 1.1.2, 1.1.4 and 1.1.5 above, and O Connor (2013b) for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.07 Long-term trend - Trend direction	In the past, the habitat would have been quite widespread in the Irish midlands. The habitat was lost from this region, however, through drainage of raised bogs for peat-extraction and coniferous forestry. Drainage of blanket bog for similar reasons also led to significant declines along the western seaboard. Most of this habitat destruction would have occurred before the end of the 1980s, however losses of blanket bog pool systems to forestry continued until at least the early 1990s. While individual sites were certainly lost during the long term trend period, it is considered unlikely that these losses led to a reduction in the range since 1989. It is assumed that such losses ceased to occur in the mid-1990s.
2.3.09 a) Favourable reference range - In km2	While the range of dystrophic lakes and ponds has declined significantly in the past, there is no evidence of a decline since the Directive came into force. The area of the range is large at approximately 21% of the terrestrial grid and the habitat is widespread, occurring in 12 counties. Consequently, it can be assumed that the current range is large enough to allow the long-term survival of the habitat. As a result, the current range is set as the Favourable Reference Range. This FRR represents an improvement on that reported in 2007 (71,700 km2), which was a significant overestimate (see 1.1.2).
2.3.10 a) Reason for change - genuine change?	There has been no genuine change in the range of lake habitat 3160.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Recent work, such as Drinan (2012), has significantly improved the understanding of the habitat. This assessment also made greater use of older studies on lake vegetation (e.g. Visser and Zoer, 1972, 1976, Heuff, 1984, Free et al., 2006, 2009). In addition, macrophyte data are available for a small number of lakes with habitat 3160 through the Irish EPA's routine Water Framework Directive monitoring of lake macrophytes.
2.3.10 c) Reason for change - use of different method	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of a different approach to mapping the distribution of the habitat and the new range tool. The main reason for the change in the range was the different approach taken to mapping the habitat's distribution. This is described in sections 1.1.2 and 2.3.9 d) above, and in greater detail in O Connor (2013b). The recommended Range Tool was used and this has been demonstrated to produce a significantly larger range to method of range mapping used in 2007 (see O Connor, 2013a).

Field label	Note
Habitat code: 3160	
2.4.01 Surface area	The surface area of the habitat was based on the surface area of the mapped lakes and ponds containing the habitat. A two-step process was adopted. Firstly, the area of all 4,274 lake segments identified as containing habitat 3160 was summed (see 1.1.2 and O Connor (2013b) for further information on 3160 lake distribution). The summed lake surface areas came to 22.2 km2. Secondly, it was assumed that some of the 4,249 lake segments less than 1 ha in area that were not examined, also contain habitat 3160. Only those lakes less than 1 ha in area were considered, as the vast majority of lakes > 1ha that contain the dystrophic habitat were captured by the distribution mapping process. Owing to the significant number of errors identified in the national dataset, a correction factor was applied (see O Connor, 2013b for further information on errors). This was based on the percentage area of lake segments < 1 ha examined to which no lake habitat was assigned. The total area of the 192 unassigned polygons < 1 ha was 69 ha. This represents 7% of the total area (983 ha) of the 4,164 polygons < 1 ha examined. The total area of the 4,249 lake segments < 1 ha that were not examined was 11.1 km2. This was reduced by 7% to 10.3 km2, to take account of the errors in the dataset. The total area of the 3,972 lake segments < 1 ha to which one or more of the lake habitats was assigned was 9.1 km2. 8.7 km2 or 96% of this area was assigned to 3160. 96% of 10.3 km2 is 9.9 km2. The two figures (22.2 km2 and 9.9 km2) were summed to give 32.1 km2. As 292 of lake segments mapped as dystrophic also contain lake habitat 3110, this figure is slight overestimate of the area of the habitat in the mapped lakes. However, during the distribution mapping process it became clear that many dystrophic lakes and ponds, within areas of blanket bog in particular, were not captured in the WFD_LakeSegment feature data class. Overall, therefore, 32.1 km2 is considered likely to be an underestimate of the area of the habitat in Ireland.
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The surface area was based on the “WFD_LakeSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.4.09 Long-term trend - Trend direction	As explained in 2.3.7, significant losses of dystrophic lakes and ponds have occurred as a result of peat-extraction, afforestation and other drainage activities on raised and blanket bogs. These losses continued, particularly as a result of forestry, up to the early 1990s. Consequently, the trend in the surface area of the habitat since 1989 is an overall decline, which is assumed to have stabilised since the mid- to late-1990s.

Field label	Note
Habitat code: 3160	
2.4.12 a) Favourable reference area - In km2	Historically, the loss of dystrophic lakes and ponds associated with active blanket bog and, to a lesser extent, active raised bog, has been extensive. These losses resulted from mechanised turf cutting and industrial peat extraction, as well as afforestation of peatland areas. Arterial drainage schemes may also have contributed to the loss of the dystrophic habitat in the past. However, no losses have been documented since the Directive came into force. The current surface area of 32.1 km2 provided here, while considered likely to be an underestimate of the true surface area, represents a significant improvement on the 2007 assessment in which the surface area was reported as unknown. As the habitat is widespread and found in a large number of individual lakes and ponds, the current area is assumed to be large enough to support its long-term survival. As a result, and because there is no evidence of a decline in area since the Directive came into force, the surface area is set as the Favourable Reference Area.
2.4.13 a) Reason for change - genuine change?	There has been no genuine change in the area of lake habitat 3160.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	See 2.3.10 b) which describes the improved knowledge used in this assessment.
2.4.13 c) Reason for change - use of different method	The main reason for the change was the different approach taken to mapping the habitat's distribution. This is described in section 1.1.2 and 2.3.10 c) above and in greater detail in O Connor (2013b).

Habitat code: 3160

2.5 Main pressures	The pressures were based upon information from Drinan (2012), other recent research into the impacts of conifer forest and peatland drainage on water quality, examination of OSi 2005 orthophotographs during the distribution mapping process and expert opinion. The 3160 lake segment distribution was also compared to the Forest Service's Forestry 2007 forest cover data and the distribution of blanket peat. Reference was made to Water Framework Directive Reports (River Basin Management Plans, associated Water Management Unit Action Plans and the 2005 Article 5 Report), national Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, EPA, 2008, http://testweb.epa.ie/irelandsenvironment/). Dystrophic lakes and ponds can be destroyed and damaged by drainage. While there is no evidence of new drainage impacting on the habitat during the reporting period, pre-existing drains are considered to exert on-going significant pressures. The habitat is also significantly impacted by indirect pressures in the upstream catchment. Upstream peatland drainage can cause to hydrological changes in dystrophic lakes and ponds, while the resultant mineralization of peat increases losses of ammonia and dissolved and particulate organic fractions (notably dissolved organic carbon) to water. These losses in turn cause increased colour and turbidity, increased sedimentation and enrichment of dystrophic lakes and ponds. Enrichment in these instances is promoted by increased biomass of the bacteria and fungi that can utilise organic fractions, as well as of primary producers. The loss of organic acids from drained and degraded peatland has been demonstrated to result in acid episodes is Irish streams, however, there is less evidence for acidification of lakes and ponds. Conifer forest on peatland combines the peatland drainage impacts describe above with the importation of additional plant nutrients. Owing to the poor phosphorus retention capacity of peat, fertilisation of conifer crops is associated with significant nutrient losses to water. As the form of sylviculture practised in Ireland is clearfelling, harvesting also results in significant and prolonged nutrient losses, owing to the break-down of needles, twigs and branches over time. The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on habitat 3160. The pressures identified, listed in an approximate order of importance, were: 1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance 2. C01.03.02 X, mechanical removal of peat, High importance 3. J02.07, Water abstractions from groundwater, High importance (peatland drainage in the upstream catchment) 4. J02.05, 'Modification of hydrographic functioning, general, High importance (drainage of the outflow/downstream) 5. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, Low importance H01.05 was used to cover all pollution pressures on habitat 3160 from conifer plantations. Alternatively, a suite of "B, Sylviculture, forestry" codes could have been used, including B01, forest planting on open ground, B02.01, forest replanting, B02.02, forestry clearance and B05, use of fertilizers (forestry). J02.07 was used to describe the pressures arising from peatland drainage in the upstream catchment. Whether the water within actively growing peat can in fact be described as 'groundwater' is open to debate. The absence of an unambiguous code for the pressure of land drainage is likely to result in inconsistencies in Article 17 reporting, both within and among Member States. Areas of wetland and other terrestrial habitats are frequently drained in Ireland

Field label	Note
	and other parts of north-west Europe for purposes such as development, agriculture, forestry and peat-cutting, resulting in direct impacts to the terrestrial habitat and indirect impacts to downstream aquatic habitats and species. J02.05 was used to indicate drainage/de-watering pressures resulting from drainage within or downstream of the lake/pond. Again, a range of alternate codes could have been chosen and it was unclear which, if any, accurately describe this pressure, whereby channels are excavated for the purpose of lowering the water table within the habitat. Pollution qualifiers were not used, with the exception of C01.03.02. Drinan (2012) found that forestry resulted in eutrophication of blanket bog lakes and had a significant negative impact on their ecology, notably on chydorid and macroinvertebrate assemblages. These impacts were evident in lakes with mature, standing conifer forests in their catchments and were most significant where there had been clearfelling. Further information on how these pressures can impact on habitat 3160 is given in the backing document (O Connor, 2013b).
2.5.01 Method used - pressures	Information on blanket bog lakes and ponds, water quality impacts from peatland drainage and conifer forest, pressures on general water quality and expert judgement were used to determine the pressures on lake habitat 3160. See 2.5 for further information.

Habitat code: 3160

2.6 Main threats

All pressures documented at 2.5 were also listed as threats. In addition, climate change was identified as a threat.

1. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, High importance
2. C01.03.02 X, mechanical removal of peat, High importance
3. J02.07, Water abstractions from groundwater, High importance (peatland drainage in the upstream catchment)
4. J02.05, 'Modification of hydrographic functioning, general, High importance (drainage of the outflow/downstream)
5. M01, Changes in abiotic conditions, High importance
6. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, Low importance

Climate change has the potential to exacerbate all of the current pressures and may already be having an impact on the habitat. It has not been included as a pressure in 2.5, however, as it has not been formally documented as impacting on dystrophic lakes and ponds.

Predictions for the future climate of Ireland generally agree on increases in average annual precipitation and air temperatures, and a likely increase in storm events. There is less agreement as to the geographical or seasonal variations, however it seems likely that increases in precipitation and storms will be greatest along the west coast, particularly the north-west; the areas in which habitat 3160 occurs. A recent review of meteorological data demonstrates:

An increase in the number of warm days (those with temperatures over 20 °C) in the period 1961 to 2010

A decrease in the number of frost days (those with temperatures below 0 °C) in the period 1961 to 2010

The annual average surface air temperature has increased by approximately 0.8 °C over the last 110 years

A rise in temperatures in all seasons

A 60 mm or 5% increase in annual average rainfall for the period 1981 to 2010 in comparison to the 30-year period 1961 to 1990

In general, larger increases in rainfall amounts in the western half of the country

Some conflicting patterns in the number of wet days (days with rainfall greater than 0.2 mm) and heavy rain days (days with rainfall greater than 10 mm), but an apparent increase in both in the west, particularly mid and north-west (Dwyer, 2013).

Warmer temperatures and greater seasonal variations in rainfall (droughts and floods) are likely to increase the decomposition of damaged peatlands and the losses of organic acids, other dissolved and particulate organic matter, colour and ammonia to water, further increasing enrichment, sedimentation and acidification pressures. In addition, increased rainfall and, in particular, an increase in storm events would result in increases in direct losses of chemical fertilisers from forestry lands. As acid episodes in Irish rivers are related to rainfall events, changes in precipitation and, in particular, storm events, is a concern. It is recommended that the influence of climate changes on dystrophic lakes and ponds should be monitored.

2.6.01 Method used - Threats

See 2.5 and 2.6.

Habitat code: 3160

Field label	Note
2.7 Complementary information	The interpretation manual of EU habitats provides a short list of plant species associated with habitat 3160 and also notes the presence of Odonata (CEC, 2007). This list was reviewed against available publications on dystrophic lake and pond communities in Ireland (Drinan, 2012, Drinan et al., 2011 Visser and Zoer, 1972, 1976, Heuff, 1984, Free et al., 2006, 2009) and Great Britain (Palmer 1989, 1992, Palmer et al., 1992, Duigan et al., 2006), as well as publications on aquatic macrophyte species (Preston and Croft, 2001), aquatic invertebrate groups (Nelson and Thompson, 2004, Foster et al., 2009, Nelson et al., in prep) and EPA macrophyte raw data from routine Water Framework Directive monitoring (2001-2012). This review produced the following lists of typical species: Typical plant species: Sphagnum cuspidatum Sphagnum auriculatum (= denticulatum) Juncus bulbosus Potamogeton polygonifolius Cladium mariscus Elogiton fluitans Menyanthes trifoliata Myriophyllum alterniflorum Nitella flexilis Nitella translucens Nymphaea alba Sparganium angustifolium Utricularia intermedia Utricularia minor Drinan (2012) recorded a total of 24 macrophyte species in 13 blanket bog lakes, with species richness at individual sites varying from 1 to 14. Lowland lakes had significantly greater median species richness (11) to upland lakes (5). Upland lakes were characterised by Juncus bulbosus, Carex rostrata and Menyanthes trifoliata. Lowland lakes had these same species, plus species such as Cladium mariscus, Elogiton fluitans, Eriocaulon aquaticum, Utricularia intermedia and Hypericum elodes. Other species that were frequently encountered and more abundant in lowland lakes include Potamogeton polygonifolius and Lobelia dortmanna (Drinan, 2012). Typical chydorid cladoceran species: Alona affinis Alona costata Alona rustica Alonella excisa Alonella nana Alonopsis elongata Camptocercus rectirostris Chydorus sphaericus Eurycercus lamellatus Pleuroxus truncatus Drinan (2012) investigated the chydorid cladoceran communities in blanket bog lakes and found Alonopsis elongata, Chydorus sphaericus, Alonella excisa and Alonella nana were common to all sites, while lowland lakes were characterised by Alona affinis, Pleuroxus truncatus, Eurycercus lamellatus, Camptocercus rectirostris and Alona costata, and upland lakes by Alona rustica. Typical aquatic macroinvertebrate species:

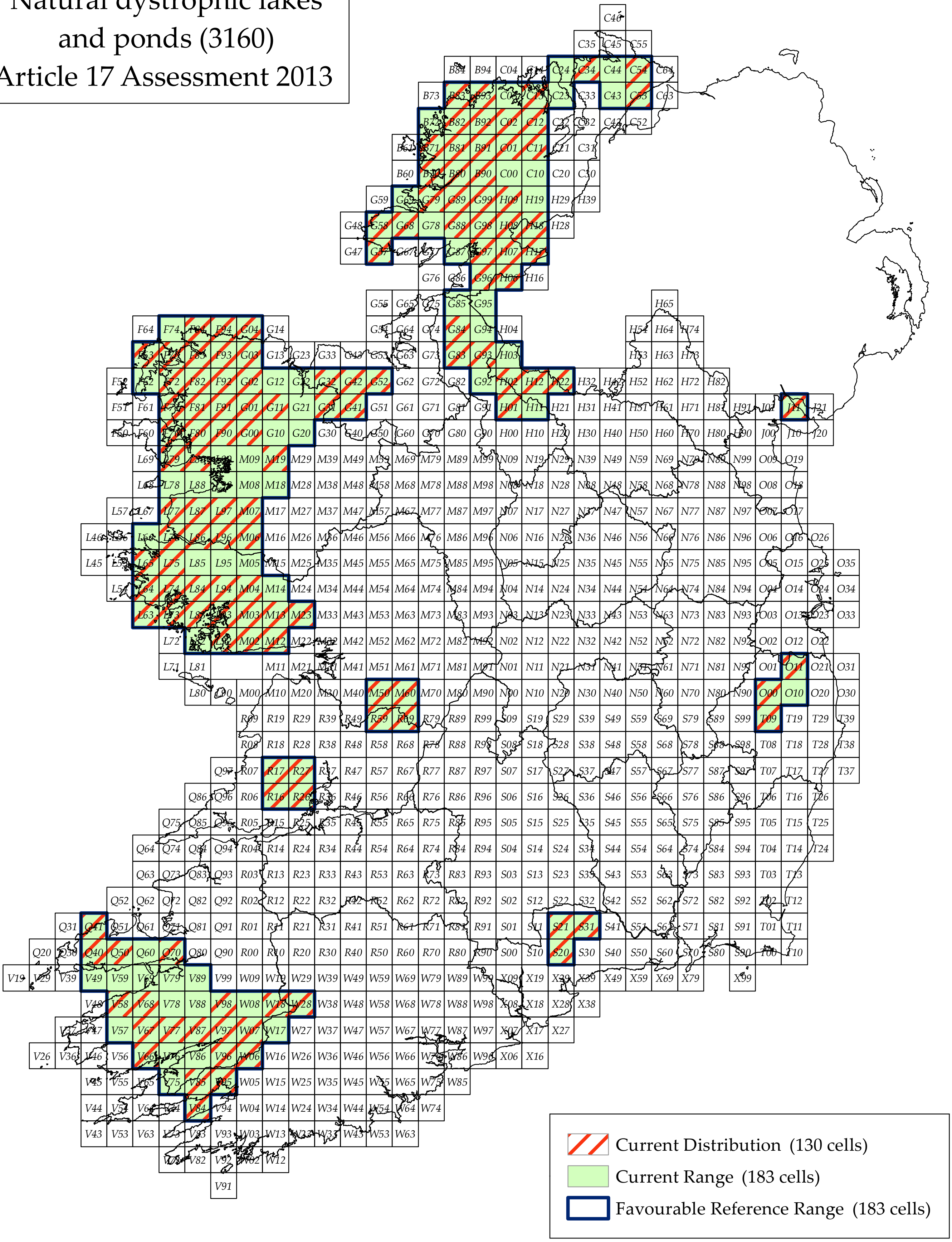
Field label	Note
Habitat code: **3160**	
	Acilius sulcatus Aeshna juncea Agabus arcticus Cordulia aenea Dytiscus lapponicus Gyrinus minutus Gyrinus substriatus Helophorus flavipes Hydroporus gyllenhalii Hydroporus obscurus Hydroporus pubescens Hydroporus tristis Ilybius aenescens Leptophlebia vespertina Pyrrhosoma nymphula Sigara scotti Nelson et al. (in prep.) identified the following water beetle species as characteristic of upland and moorland lakes: Gyrinus minutus, G. substriatus, Acilius sulcatus, Agabus arcticus, Ilybius aenescens, Hydroporus gyllenhalii, H. obscurus, H. pubescens, H. tristis, and Helophorus flavipes. Drinan (2012) found that the commonest macroinvertebrate species in the blanket bog lakes studied were Leptophlebia vespertina (Ephmeroptera), Pyrrhosoma nymphula, Aeshna juncea (both Odonata) and Sigara scotti (Heteroptera). The gastropod Lymnaea peregra, the ephemeropteran Caenis luctuosa, the trichopterans Mystacides azurea, Polycentropus irroratus, Holocentropus dubius and smaller dytiscid beetles such as Hydroporus erythrocephalus and Nebrioporus assimilis were more frequent and abundant in lowland blanket bog lakes (Drinan, 2012). By contrast, upland blanket bog lakes had larger dytiscids such as Dytiscus laponicus, Colymbetes fuscus and Acilius sulcatus. Rare invertebrates found in the habitat were the endangered downy emerald dragonfly, Cordulia aenea, and the near threatened Agabus arcticus and Dytiscus lapponicus (Foster et al., 2009, Drinan et al., 2011, Nelson et al., 2011, Drinan, 2012).

Field label	Note
Habitat code: 3160	
2.7.04 Structure and functions - Methods used	No dedicated monitoring programme exists for dystrophic lakes and ponds in Ireland and a standard method for assessing the habitat's conservation condition at individual sites has not yet been developed. A recent PhD has demonstrated significant impacts in blanket bog lakes as a result of conifer plantation forestry and identified such forest areas as "the single greatest threat to the conservation status of blanket bog lakes in western Ireland" (Drinan, 2012, Drinan et al., 2013 a, b). The loss of the 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. In addition, there has been a significant research effort into the impacts of forest operations, particularly clearfelling, on water quality in recent years. The work has concentrated on conifer plantations on peat soils and has examined nutrient, sediment and dissolved organic carbon (DOC) losses, in particular. Acidification of surface waters has also been the subject of on-going research. A review of the results of these studies demonstrated that significant increases in nutrient, sediment and DOC are common across forests on peatland and increase during and following clear felling. Biological responses in rivers are less easy to detect. This is unsurprising, given the rapid transport of pollutants (nutrients, sediment, acid, DOC) through flowing waters in these areas, as well as the likelihood that the drained and degraded peatlands yield chronic losses that may mask episodic events. It is reasonable to assume, however, that the documented pollutant losses will have proportionately greater biological impacts on downstream lakes and ponds, owing to their longer retention times. Combining: 1. the significant negative ecological impacts documented in the studied blanket bog lakes, with 2. the data on physico-chemical impacts on water quality emerging from studies on forestry on peatland, and 3. the scale of the pressures, notably forestry on peatland, peat extraction and other degradation of peatland, in the catchments of dystrophic lakes and ponds in Ireland the habitat was assessed as unfavourable inadequate.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the habitat is concentrated in counties Donegal, Sligo, Mayo, Galway, Clare and Kerry, with other sites associated with upland areas such as the Slieve Aughty, Wicklow and Cuilcagh Mountains. 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 21% of the terrestrial grid, the range is considered to be favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The estimated area of the habitat is 32.1 km2. As there is no evidence of a significant decline in area since the Directive came into force and the habitat is dispersed across a large number of individual lakes/ponds and blanket bog complexes, the area is considered to be favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although there has been no dedicated monitoring of habitat 3160 during the period, research has demonstrated significant impacts on water quality and the ecology of dystrophic lakes and ponds as a result of drainage, forestry and other degradation of peatlands. Expert opinion, the available data and the extent of these pressures in the catchments of dystrophic lakes and ponds indicate that the national status of the structure and functions of habitat 3160 is inadequate.

Field label	Note
Habitat code: 3160	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As significant areas of conifer forest on peatland has reached maturity in recent years, the pressures associated with clearfelling and re-planting are likely to have increased over the reporting period. The trend for structure and functions, based on expert opinion, is assessed as declining.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive (WFD) provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. Most dystrophic lakes and ponds, however, are too small to be considered by the WFD, which focuses on lakes of 50 ha or more. While approximately 24% of the Irish EPA's WFD monitoring lakes are less than 50 ha in area, only three are considered to have the dystrophic habitat. The WFD monitoring methods currently in use have been designed to detect eutrophication impacts in lakes and may not be able to detect the impacts of dissolved and particulate organic carbon, colour and peat sediment, or separate them from those of nutrient enrichment. The lack of monitoring (WFD and HD) means that issues are unlikely to be detected and, consequently, that measures will not be implemented through River Basin Management Plans (RBMPs). Furthermore, the existing suite of WFD measures are focussed on reducing enrichment from dissolved nutrients, particularly phosphorus. There are currently no measures to address drainage or other degradation of peatland. At the sites where septic tanks are a pressure, the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS) and resultant upgrades should, with time lead to improvements. Overall, however, it is considered unlikely that the WFD will significantly contribute to the protection or improvement of the condition of dystrophic lakes and ponds. It is likely that maintenance or restoration of habitat 3160 will require dedicated Sub-basin Management Plans at a bog-complex or upland scale, with measures specifically designed to address pressures from peatland drainage and degradation, forestry on peatland, peat-cutting and other site-specific issues. The National Peatland Strategy is currently under development, in response to reasoned opinion 2010/2161, and it is intended that one of the issues it will address is carbon losses from degraded peatland. The strategy may, with time, lead to measures to restore areas of peatland for carbon sequestration purposes. The strategy is also likely to generate conservation actions to rehabilitate and restore blanket bogs that could benefit dystrophic lakes and ponds through direct restoration and/or the reduction of catchment pressures. It should be noted, however, that economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural reclamation of peat and peaty soils is ongoing, in the west, in particular. These considerations combined with the current status of the habitat's structure and functions, on going pressures and the threats posed by climate change mean that the future prospects are considered inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	See 2.8.4 a). It would appear overall that without dedicated conservation programmes for the habitat, the pressures on habitat 3160 will most likely continue into the future. The future prospects qualifier is, therefore, considered to be stable.

Field label	Note
Habitat code: 3160	
2.8.05 Overall assessment of Conservation Status	Both the range and the area of dystrophic lakes and ponds declined before the Habitats Directive came into force. Since the mind-1990s, however, the loss of the habitat through drainage for afforestation and peat cutting is considered to have ceased. As the range and area are now stable and given the large number of individual lakes and ponds distributed across blanket-bog complexes and upland area in 12 counties, both were assessed as favourable. Using expert knowledge and recent research into the ecology of blanket bog lakes and the impacts of drainage and forestry in peatland areas on water quality, the structure and functions of the habitat were assessed as inadequate declining. The likelihood that the pressures will continue in the future and be exacerbated by climate change resulted in inadequate but stable future prospects. Driven by the status of the structure and functions and the future prospects, the overall conclusion was unfavourable inadequate.
2.8.06 Overall trend in Conservation Status	The overall trend is considered to be declining, given the inadequate status and declining trend of the structure and functions and the prediction that pressures will continue on the habitat in the future.
3.1.02 Method used	The shapefile of lakes with habitat 3160 was intersected with the shapefile of the SAC networkand all lakes occurring within the network selected. 2,587 of the 4,274 lakes assigned habitat 3160 were within the network. These totalled 12.8 km2 in area. In addition, a shapefile was created of the 4,249 lake segments < 1ha in area that were not examined during the lake habitat assessments (2007-2012). This shapefile was intersected with the SAC network and 581 unexamined lakes with a total area of 1.6 km2 found within the network. Using the same correction factor (- 7%) and percentage area of lakes with habitat 3160 (96%) used in 2.4.1, the additional area of habitat 3160 within the network was estimated as 1.4 km2. Summing these two figures (12.8 km2 and 1.4 km2) gave a total area of 14.2 km2 of habitat 3160 within the network. The same method was used to estimate the area of the habitat within SAC selected for its protection (figure given in 2.7.5). 2,143 lake segments with habitat 3160 (3160_Lake_Segment_Distribution_AOC_Final_06Jun2013.shp) totalling 10.4 km2 in area were found within the ten SAC selected for the habitat. Ten unexamined segments (Lake_Habitat_Segment_Unassigned_LESS_THAN_1HA_v7.0.shp), totalling 3.3 ha or 0.033 km2 were found within the ten SAC. Therefore, 0.029 km2 of habitat 3160 was estimated to occur within the ten SAC from the unexamined segments. As all figures were rounded to one decimal place, the total area of habitat 3160 estimated to occur in the SAC for its protection was 10.4 km2
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for habitat 3160 in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). The habitat is also afforded some legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Drain-blocking (4.2) in blanket bog areas of Mayo by Bord na Mona is creating new systems of dystrophic ponds. There are, however, no significant conservation measures currently being undertaken to restore or enhance areas of 3160 habitat within SAC. More detailed surveillance of the habitat would be required before such measures could be planned.

Natural dystrophic lakes and ponds (3160)
Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3180

NAME: Turloughs

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2005-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	15800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	15800
	operator	N/A
	unknown	No
	method	As there is no evidence of a decline since the Directive came into force and there is no reason to assume that the range is not large enough to allow the long-term survival of the habitat, the current range is set as the Favourable reference range. Many of the turloughs included in the distribution need to be verified in the field, therefore the Range and Favourable reference range may be adjusted in the future.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	68.87		
2.4.2 Year or period	1992-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	68.87	
	operator	N/A	
	unknown	No	
	method	As there is no evidence of any significant change in extent since the Directive came into force, and recent surveys have revealed additional previously unreported areas of turlough habitat, the current area is set as the Favourable reference area. Many of the turloughs included in the distribution need to be verified in the field, therefore the Area and Favourable reference area may be adjusted in the future.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	medium importance (M)	Phosphor/Phosphate input (P)
diffuse groundwater pollution due to non-sewered population (H02.07)	low importance (L)	Phosphor/Phosphate input (P)
stock feeding (A05.02)	low importance (L)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Pollution to groundwater (point sources and diffuse sources) (H02)	low importance (L)	Phosphor/Phosphate input (P)

2.5.1 Method used – pressures: based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse groundwater pollution due to non-sewered population (H02.07)	low importance (L)	Phosphor/Phosphate input (P)
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	medium importance (M)	Phosphor/Phosphate input (P)
agricultural intensification (A02.01)	low importance (L)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
removal of stone walls and embankments (A10.02)	low importance (L)	N/A
flooding and rising precipitations (M01.03)	low importance (L)	N/A
grassland removal for arable land (A02.03)	low importance (L)	Phosphor/Phosphate input (P)
Pollution to groundwater (point sources and diffuse sources) (H02)	low importance (L)	Phosphor/Phosphate input (P)
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Alona rustica

Alonella exisa

Alonopsis elongata

Agabus labiatus

Berosus signaticollis

Dryops similaris

Graptodytes bilineatus

Lestes dryas

Sympetrum sanguineum

Eurycercus glacialis
Polycelis nigra
Alona affinis
Diaptomus castor
Agabus nebulosus
Bagous limosus
Haliplus obliquus
Haliplus variegatus
Helophorus minutus
Helophorus nanus
Hygrotus impressopunctatus
Laccobius colon
Laccobius minutus
Ochthebius minimus
Rhantus frontalis
Pherbellia nana
Colobaea distincta
Ilione albiceta
Pherbina coryleti
Paraponyx stratiotata
Bactra furfurana
Monochroa lutulentella
Deltote uncula
Blethisa multipunctata
Chlaenius nigricornis
Pelophila borealis
Agonum piceum
Carabus granulatus
Loricera pilicornis
Pterostichus nigrita
Bembidion clarkii
Agonum muelleri
Bembidion aeneum
Agonum lugens
Platynus livens
Badister meridionalis
Badister peltatus
Philonthus furcifer
Thanatophilus dispar
Tetrix subulata

Chorthippus albomarginatus
Saldula opacula
Alopecurus aequalis
Callitriche palustris
Carex viridula agg.
Eleocharis acicularis
Frangula alnus
Galium boreale
Limosella aquatica
Persicaria minor
Plantago maritima
Potentilla fruticosa
Ranunculus repens
Rhamnus cathartica
Rorippa islandica
Schoenus nigricans
Teucrium scordium
Viola persicifolia
Cinclidotus fontinaloides
Drepanocladus sendtneri
Pseudocalliergon lycopodioides
Pseudocalliergon trifarium
Riccia cavernosa
Ophioglossum vulgatum

2.7.2 Species method used

As wetlands with distinct terrestrial and aquatic phases, turloughs have a range of typical species that can broadly be divided into wetland and aquatic species. In listing the typical species for the various groups, strong emphasis has been placed on 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 turloughs (characteristic species).
For vascular plants, relevés were recorded from a series of 22 turloughs, considered to cover the range of habitat variation found within Ireland. These were used to derive vegetation communities (see Sharkey, 2012). Some of the described communities were used as indicators for Structure & Function assessment, and some of the species were used individually as indicators. An updated list of typical species will be proposed for future monitoring. For a full list of widespread plant species which are commonly found in turloughs see Waldren et al. (2013).
Macroinvertebrates were collected from the littoral zone of the 22 turloughs. Typical species were chosen based on those considered to be ecologically restricted to particular turlough conditions. Often these were used as indicators of good water quality or were local species indicating good conservation status.

2.7.3 Justification of % - thresholds for trends

2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Pressures and threats causing impacts in turloughs are likely to operate at or immediately adjacent to the habitat (Intensive cattle gazing, Stock feeding, Removal of stone walls) or in the zone of groundwater contribution (Groundwater pollution, Flooding and rising precipitations, Grassland removal). The impacts of flooding and rising precipitation are from predicted climate change. Note that several additional pressures/threats such as E01.03 'Dispersed Habitation' could have been used; however, it was considered that the major impact of such dispersed habitation would be via groundwater pollution, and hence the pressure/ threat was coded as H02.07 'Diffuse groundwater pollution due to non-sewered population'. H02 covers discharges from farms. Grazing impacts have been considered as 'intensive' (A04.01) rather than 'non-intensive' (A04.02), though the differences between these are unclear – turloughs are generally NOT part of an intensive agricultural system (e.g. grazing dairy herds on improved grassland), though locally the grazing intensity can be high. 36.59km2 of turlough habitat are listed as a qualifying feature within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km^2)	min	38.51	max	38.51
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance

Field label	Note
Habitat code: 3180	
0.2 Habitat code	A turlough is a depression in karst limestone that temporarily and/or seasonally floods from groundwater. There is usually winter flooding, and recession of flood water during summer, though this varies greatly with rainfall and groundwater dynamics, and there is considerable variation in flooding regime among different turloughs. Turloughs lack a permanent overland outflow, though sometimes there is overland inflow. They are entirely restricted to well-bedded, relatively pure karst Carboniferous limestone. Turloughs typically contain wetland vegetation communities in their lower zones, and communities more characteristic of drier limestone soils in their upper zones. Turloughs therefore do not generally contain unique vegetation types and in some cases may not be easy to distinguish from other wetlands; the NPWS database of turloughs (Mayes, 2008) contains many areas identified as potential turloughs, but which await detailed on site verification. Turloughs contain numerous specialist aquatic invertebrates; they also provide important winter feeding grounds for several species of waterfowl and wading birds, with some of these species utilising the habitat for breeding. Turloughs are largely restricted to Ireland, though turloughs have also been described very locally from Estonia, Germany, Slovenia and Wales.
1.1.01 Distribution map	A LAEA projection was derived by transforming the Irish Grid distribution map referred to in 1.1.4
1.1.02 Method used - map	The NPWS database of turloughs, which was based on a combination of field surveys and desk study using the available mapping (notably the six-inch series and orthophotography) (Mayes 2008) was updated with recent records from counties Roscommon (Kearney, 2011), Monaghan (Foss & Crushell, 2012) and Westmeath. Several of these 'new' records from each county, and all 'new' records from Co. Sligo (Wilson, 2009) were already incorporated into this database; all of these duplicated records were discounted along with a very small number of duplicates detected in the database (e.g. Coolcam, Lisduff). Sites included in the database but which were not likely to be turloughs (based on comments provided) were not included in the distribution. Grid references from the accepted turlough records were used to generate the distribution map. Using the estimated surface area of turloughs (see section 2.4.1 below), turloughs likely to be intersecting hectad boundaries were examined using 2005 OSi aerial photography on the 6 inch map series to determine which 10 km squares should be selected.
1.1.03 Year or period	All available records post 1992 were used to generate the distribution map. All available turlough records were used, these records have been compiled by Mayes (2008), with some recent supplementary records from counties Roscommon (Kearney, 2011), Monaghan (Foss & Crushell, 2012) and Westmeath. Mayes (2008) also examined 2005 aerial photography in conjunction with the GSI karst database and the 6 inch maps to identify potential turloughs. Several of the sites have not been ground truthed; ground truthing for other turloughs will have taken place at various times in the past. The records used therefore represent data collated over an extended period of time but reviewed by Mayes (2008) and again for the current assessment.
1.1.04 Additional distribution map	A map was produced by intersecting the known turloughs referred to in 1.1.2 with the 10km Irish Grid.

Field label	Note
Habitat code: 3180	
1.1.05 Range map	The range map was generated from the updated database of turlough records referred to in sections 1.1.2 and 1.1.3. The range map was derived using the distribution map provided in 1.1.4 and the range tool.
2.2 Published sources	The main references listed used in this assessment were the draft chapters from an NPWS-funded research project to investigate the ecological functioning and conservation of turloughs. Additional information was sourced from Mayes (2008) turlough inventory, Local authority county habitat surveys and EPA reports relating to water quality.
2.3.01 Surface area - Range	The range was based on distributional data for turloughs described in section 1.1.2 above, and was generated using the standardised Range Tool. A buffer of 7 ha (see 2.4.1), representing the average estimated area, was applied to all turloughs. Turloughs that straddled the 10 km boundary were examined using aerial photography to determine which 10 km2 was occupied by the turlough.
2.3.02 Method used - Range	See field 2.3.1
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	Turloughs are essentially landforms in karst limestone, so the range is highly unlikely to increase through development of new habitat. Increases in range are only likely through improved knowledge and field survey; this has in fact lead to small increases in range (and hence area of habitat) over the reporting period (e.g. Kearney, 2011; Foss & Crushell, 2012). During the past 12 years two sites which may have been turloughs are known to have been lost, at Ballyadam (Co. Cork – one of two sites was filled in between 2003 and 2007; Mayes 2008) and Doughiska (Co. Galway – site destroyed during construction of a bypass interchange). However, field survey has never confirmed these as turloughs. Examination of aerial photographs of Ballyadam suggests a long history of agricultural fields, and no mention of 'liable to flood' on any 6" map; in summary there is little direct evidence to suggest that this was a turlough. One potential turlough is thought to have been lost since the Directive came into force: Aghamore (Co. Sligo) was irrecoverably damaged around 2000 (ie prior to 12 year reporting trend for 2013 report) due to a car salesroom being built on it (which was abandoned when it subsequently flooded, but the habitat is lost); further clarification of the status of this site as a (former) turlough is required. All of these sites require confirmation that they were turloughs (which may well be difficult for totally degraded sites) and all require ground truthing to ascertain the relationship between the degraded area and the location of the potential turloughs. In some cases, even if these could be confirmed as lost turloughs, this would still not alter the distributional range within Ireland. For these reasons, the trend for turlough range is considered to be stable.
2.3.10 c) Reason for change - use of different method	Improved mapping techniques,more consistent methods for determining continuity of isolated locations, and provision of the range tool for calculating range were also responsible for changes since 2007.

Field label	Note
Habitat code: 3180	
2.4.01 Surface area	The NPWS database of turloughs was used to determine the distribution of turloughs in Ireland. For the majority of turloughs recorded, no estimation of the area is given; areas are however provided for 128 turloughs. Log10 transformation of these areas gives a very good approximation to a normal distribution. However, Goodwillie (1992) provided a national survey of turloughs over 10 ha: as a result, an assumption was made that the majority of turloughs for which the area was unknown would be less than 10 ha. Accordingly, 10% of the turloughs over 10 ha were randomly selected, and together with all turloughs of 10 ha or less, the areas were log transformed and the mean value calculated. The anti-log of this mean (7.10 ha) was subsequently used to estimate the area for those turloughs for which the area was unknown. Total surface area of turloughs nationally was taken as the sum of the known or estimated areas of all turloughs. However, the determination of the surface area of turlough is fraught with difficulty. Two different approaches have looked at either the extent of maximum flooding or the extent of vegetation influenced by the turlough hydrological regime. Extent of maximum flooding requires continuous monitoring by pressure sensing 'divers' coupled with a detailed topographic survey (as used in TCD survey – Naughton et al., in prep.), or very regular readings from a standard depth scale. The problem with this approach is that as the extent of flooding varies from year to year this can result in significantly different area estimates for the same turlough if the area is measured in a year with an extreme flood. For 22 turloughs that have been subject to detailed hydrological investigation (Naughton et al., 2012) the surface area was defined by the maximum flooded area over the two years of continuous monitoring in 2007-2009, there was no extreme flooding in this period. Other surface areas are reported by Goodwillie (1992) and are based largely on the extent of turlough vegetation communities; it is probable that most of the areas reported in Mayes (2008) are likely to have been based on Goodwillie's estimations. Problems associated with using vegetation communities include the gradual shift from wetland to dry land communities which extend beyond the influence of the turlough, and also that the upper less-flooded zones are likely to be subjected to greater modification by various land use practices. However comparisons between areas assessed by experienced turlough ecologists have shown good agreement between assessors. When comparing the two methods it is reasonable to assume that the maximum flood method will result in slightly larger estimates of turlough areas. A small part (approximately 1.8ha) of the turlough at Castlesampson Esker SAC 1625 (Co.Roscommon) was directly damaged by quarrying in the 2006-8 period. Though the vegetation was completely destroyed most of the area impacted still floods. The impact of this activity on the ecological and hydrological functioning of the rest of the turlough remains unclear.
2.4.02 Year or period	The total surface area for all turloughs was estimated by summing the areas of all turloughs used to map the distribution of the habitat (see section 2.4.1 above). The areas of 22 of these turloughs were recorded as the maximum flooded area over the period 2007-2009; other areas, where known, are largely based on those provided by Goodwillie (1992) based on extent of vegetation. These therefore represent much older information; in the case of turloughs this is generally valid as the area of the habitat is defined by groundwater flooding, and this in general is unlikely to have changed significantly over that time period.
2.4.03 Method used - Area covered by habitat	See sections 2.4.1. and 2.4.2
2.4.04 Short-term trend - Period	The default trend period was used.

Habitat code: 3180

Field label	Note
2.4.05 Short-term trend - Trend direction	There is no clear indication of significant short-term losses of habitat area. There has been a small area lost from Castlesampson. The Ballyadam and Doughiska sites known to be lost (see 2.3.4 above) are not known to be turloughs with any certainty, and have not been included in consideration of area trend. The loss of the Aghamore site in Co. Sligo is outside of the recommended 12 year period considered for short term trends, its loss would in any case be insignificant in terms of the national habitat area; its seems likely that this site was probably a turlough but this has not been verified. Recent detailed survey work, particularly in counties Roscommon and Monaghan (Kearney, 2011; Foss & Crushell, 2012) has revealed additional sites that were previously undocumented. Different methods of calculating the surface area occupied by the habitat has also lead to differences in surface area reported in 2007: the changes are therefore not genuine losses or gains of turlough habitat. Any changes are likely to be negative through drainage of the flood areas, but these are considered negligible (<<1%); one turlough mapped during the previous reporting round is not included here (see 2.3.4). Surface area reported in 2007 was 81.6 km2, in 2013 the estimate is 68.94 km2 (see 2.4.13 for reasons for change). Coxon (1987) estimates that over one third of turloughs have been affected by past arterial drainage which may well have reduced the surface area of flooding in turlough, however these impacts long predate the implementation of the EU Habitats Directive. Less certain is the more recent drainage efforts on some turloughs (e.g. Ballinderreen, Rahasane, Kilglassan) where drainage proposals were made to reduce the level of extreme floods. It is not known when these proposals have or could reduce the extent of flooded area. Several turloughs around Clarinbridge (e.g. Tonroe) have been relatively recently affected by drainage to the sea via the Clarin River; they are no longer considered to function as turloughs but again, the drainage work was brought about prior to 1994 and hence does not affect the area or trend reporting.
2.4.07 Short-term trend - Method used	Consideration was given to the losses of potential turloughs mentioned in section 2.4.5 above, however known losses of sites which cannot be attributed to turloughs with certainty should not be considered in reporting trends in area.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	While the favourable reference area given in 2013 is lower than that given in 2007, this does not reflect a genuine decrease. The change reflects improved estimates of surface area for some turloughs, improved knowledge of the distribution of turloughs and provision of a database (Mayes, 2008) of collated records for the habitat. The TCD project determined that the areas of some turloughs given in Mayes (2008) were likely errors. In particular Caranavoodaun was given as 480 ha in Mayes, 2008; the values estimated from hydrological data is 34.03 ha. Goodwillie gives an estimated area of 24.8 ha for the turlough, and an estimated catchment area of 480 ha; it seems that the wrong area was transcribed into the database in this case.
2.4.13 c) Reason for change - use of different method	In 2007, for turloughs where the area was unknown a randomly chosen subset of 25 turloughs of known area were selected. The areas of these 25 turloughs were measured using ArcGIS 9, giving an average area of 0.18 km2. This value was used together with known turlough areas to provide the national estimate of turloughs at 81.6 km2; this was considered likely to be a significant overestimate. The average area of 0.18 km2 per site or 18 ha is now considered likely to be a significant overestimate with the current method suggesting that the majority of the turloughs are probably < 10 ha.

Field label	Note
Habitat code: 3180	
2.5.01 Method used - pressures	Pressures and threats were assessed by expert knowledge of the 22 turloughs studied in detail by Waldren et al. (in prep), and by quantitative data generated by this project. Pressures and threats were compiled for each turlough from the standard list provided for Article 17 reporting. The opinion of all project members was sought, along with relevant NPWS staff. Because of their dependence on groundwater flooding for hydrological and ecological functioning, pressures and threats were considered at the level of the turlough basin, and also zone of groundwater contribution. Water quality information was provided by McGarrigle et al. (2010), EPA (2011) and O'Sullivan (2012a, 2012b). Pressures and threats were collated for the 22 turloughs studied in detail, and a matrix of pressures and threats by turlough was assembled. Pressures and threats that were most frequently identified among the 22 turloughs were identified as those most significant at the national level. Other pressures and threats known to be operating on additional turloughs (road development, drainage etc.) were also considered, but these were either included in those pressures and threats identified as described, or of too isolated occurrence to be considered at National level.

Field label	Note
Habitat code: 3180	
2.6.01 Method used - Threats	National level threats were assessed using a similar approach to pressures, as described above (section 2.5.1). Most pressures are likely to continue into the future as threats to the turlough habitat. While many turloughs have been in the past affected by drainage, most turlough drainage occurred a very long time before the Directive came into force. However, there have been calls for renewed drainage of some turloughs (e.g. Ballindereen and Rahasane) and this is an important threat. In general threats are considered likely to increase for most turloughs, in particular through agricultural intensification and drainage. Ireland's Food Harvest 2020 is very likely to lead to agricultural intensification. While there are probable limits to agricultural intensification feasible within each turlough (due to the flooding regime), agricultural intensification is likely in the zone of hydrological contribution, particularly for those turloughs where the Zone of Contribution (ZOC) contains a considerable proportion of pasture. This is likely to lead to increased nutrient run-off and pesticide/herbicide contamination of groundwater. In some areas there is evidence of very recent conversion of grassland to maize crops, and given the predicted future rise in temperatures, this is likely to continue into the future. The threats of A02.01 Agricultural intensification in the ZOC (due to Harvest 2020) and A02.03 Grassland removal for arable land (mainly the conversion of grassland to maize crops) were considered to have the greatest potential impact as threats in turloughs where the ZOC had the highest percentage of pasture and/or grassland. If applications for drainage only result in the removal of very extreme flooding events, they will be unlikely to have serious impact on the structure and ecological functioning of turloughs. However, drainage further down the basin such that median flooding levels are reduced will have serious negative consequences on turlough ecology, and clearly reduce the area of the habitat. Threats such as drainage pose a greater risk in turloughs not designated as SACs, or where turloughs are not noted as qualifying interests within SACs. Climate change is likely to impact on turloughs through predicted increases in winter rainfall thereby increasing flooding. Recent modelling exercises (O. Naughton, P. Johnston and L. Gill, unpublished) suggest that major impacts are likely due to increased rainfall. Reduced precipitation during summer leading to possible dryer conditions is not thought to have significant impacts on the ecological functioning of turloughs. Land abandonment may impact on turloughs; reduced levels of grazing may have negative impacts on the more productive (mesotrophic and eutrophic) turloughs leading to taller, ranker vegetation. Reduced grazing levels are not seen as a threat to the more oligotrophic turloughs, many of which have very low levels of grazing, probably because productivity and palatability of the sedge-dominated vegetation is low. In several turloughs the degraded state of internal walls was noted during surveys between 2006 and 2009; for those turloughs where such boundary walls are present, degradation of walls is seen as a threat which will likely lead to unrestricted animal movement in the future, removing part of the mosaic of vegetation and niches within each turlough. In the past, all farmers used their privately owned turlough land, while at present there is some private turlough land unused. The increase in the proportion of farmers not grazing their sites is a worrying trend and may be symptomatic of land abandonment in marginal areas (Moran, 2005). This, coupled with intensification of the more productive areas of farms has major consequences for biodiversity. The polarisation of management on the farm may lead to loss of biodiversity from both agricultural intensification and land abandonment simultaneously.

Field label	Note
Habitat code: 3180	
2.7.04 Structure and functions - Methods used	The ecological structure and function were calculated from 22 turloughs studied in detail by TCD using a variety of indicators (see Waldren et al. (in prep.)). Structure and function was assessed in three broad categories: hydrological functioning (Function), mean total water phosphorus (Allot et al., in prep.) and biological responses (Structure); hydrology and water chemistry are major indicators of structure and function of lakes. As noted by Sheehy Skeffington et al. (2006), turloughs are ecologically defined by their hydrological regime, and this is considered the most important ecological driver of turlough function. Groundwater quality plays a major role in ecological functioning, mainly through the tranport of phosphorus. Biological responses included algal communities, vegetation communities, and the presence of individual species of vascular plants and aquatic invertebrates. These indicators were combined to assess the status of turloughs studied in detail. Only 8 of the 22 turloughs assessed in detail were in favourable condition (though some of these were very good and are likely to be some of the best examples of the habitat globally). Only 2 of the 22 were in unfavourable – bad condition, both have had severe impacts from agriculture in areas immediately adjacent to or in the turlough. This leaves 12 of the turloughs in unfavourable - inadequate condition. Most of the turloughs (18 out of 22) had favourable hydrological functioning; as this is the most important ecological driver, this is encouraging. However, most turloughs had unfavourable water quality or biological responses mainly due to nutrient enrichment. The individual site assessments were used to estimate structure and function of turloughs nationally. Median values of indicator scores from all turloughs were used for the hydrological function, water quality and biological responses, and the assessment categories were applied in the same way as had been applied to the individual sites. Overall, hydrological funtioning was good, but water quality, and biological responses were unfavourable – inadequate.

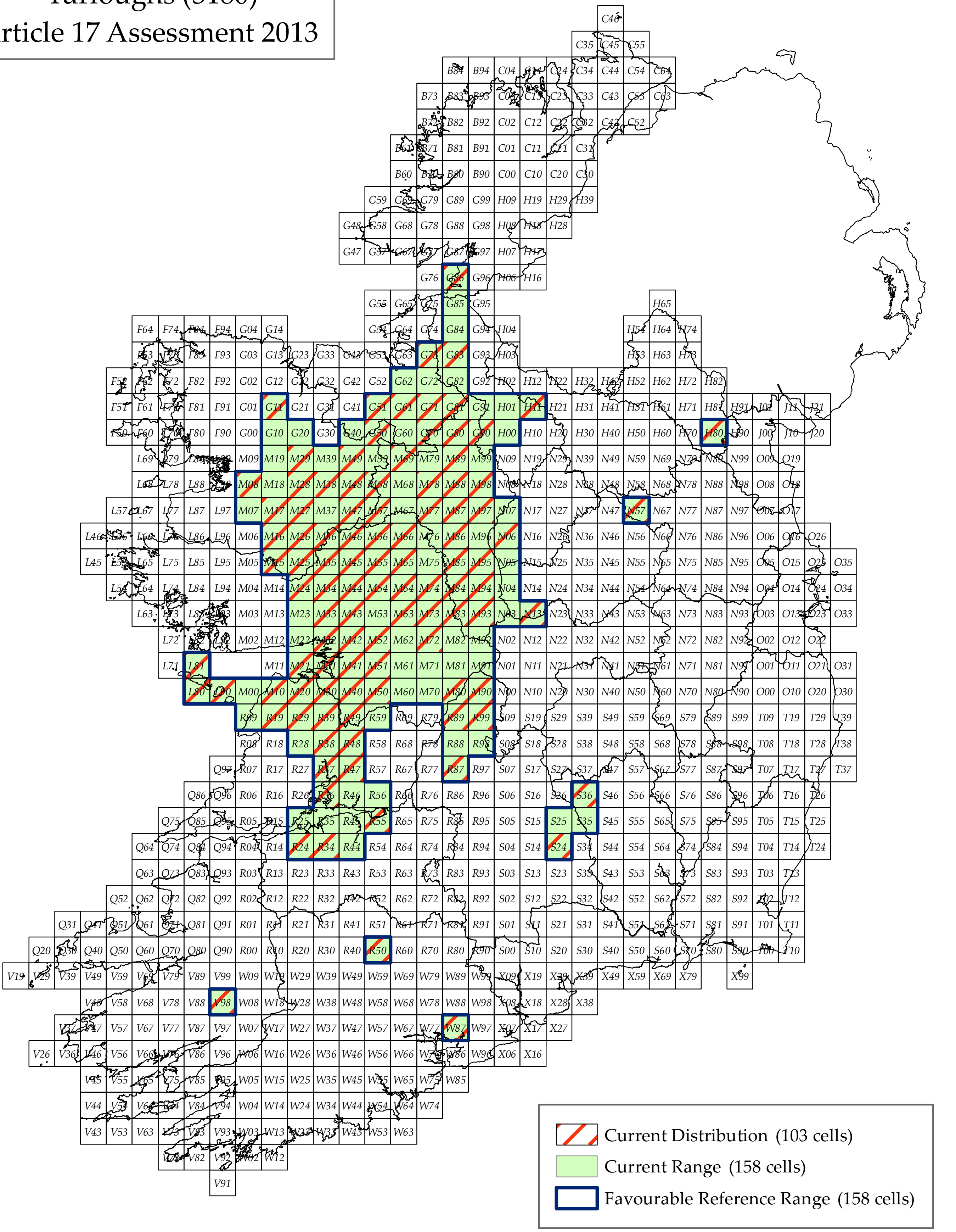
Field label	Note
Habitat code: 3180	
2.7.05 Other relevant information	Pressures and threats causing impacts in turloughs may operate at or immediately adjacent to the local habitat (Intensive cattle gazing, Stock feeding, Removal of stone walls) and/or in the zone of groundwater contribution (Groundwater pollution, Flooding and rising precipitations, Grassland removal). The impacts of flooding and rising precipitation are included to account for predictions from climate change models. While E01.03 'Dispersed Habitation' was noted it was considered that the impact of such dispersed habitation would be via groundwater pollution, and hence the pressure/threat was coded as H02.07 'Diffuse groundwater pollution due to non-sewered population'. A10.02 'Removal of stone walls and embankments' was considered to be a threat due to the deteriorating status of walls noted during field work in the late 2000's. Though not a current pressure, this is likely to become a threat as land parcel boundaries, which lead to a mosaic of landuse and hence vegetation, become disrupted potentially leading to a greater homogenisation of vegetation within any one turlough. Grazing impacts have been considered as 'intensive' (A04.01) rather than 'non-intensive' (A04.02), though the differences between these are unclear – turloughs are generally NOT part of an intensive agricultural system (e.g. grazing dairy herds on improved grassland), though locally the grazing intensity can be high. Moderate grazing in turloughs has been considered to be an important driver of turlough ecology, with too little or too much grazing considered detrimental to the conservation status (see Sheehy Skeffington et al., (2006)). The results of the TCD study on turlough ecology and conservation broadly support this view for mesotrophic and eutrophic turloughs. However, in extremely oligotrophic turloughs, very low levels of grazing (e.g. knockaunroe) or a complete lack of grazing (e.g. Lough Gealain) do not seem detrimental. Grazing levels seem to be generally lower in more oligotrophic turloughs, perhaps because the vegetation contains a higher proportion of less-palatable Carex species, and also because net primary production is likely much lower than in more mesotrophic turloughs. Lack of grazing in mesotrophic turloughs seems to lead to the development of rank tall herb vegetation which forms a monotonous cover. This potential link between grazing, productivity and conservation management requires further research. Drainage in the upper parts of catchments may lead to increased run off (and hence groundwater enrichment) and periodic high levels of groundwater, resulting in increased or flashier within-turlough flooding. This may lead to future increased calls for drainage within turloughs and, as noted above, those turloughs not listed as a qualifying interest in SACs may be most at risk.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The ecological range for turloughs mostly occurs on karst Dintantian (Carboniferous) pure, bedded limestone, mainly in the centre/west of Ireland. There is no evidence of a decline in range since the Directive came into force, and a range of ecological variation exists among existing turloughs. The current range is adequate to ensure conservation of the habitat and the favourable reference range is taken to be the current range; therefore range is assessed as Favourable.

Field label	Note
Habitat code: 3180	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As turloughs are landscape features with the ecology of the habitat largely determined by temporary groundwater flooding, only drainage or complete in-filling of turlough basins is likely to reduce the area of the habitat. Most arterial drainage took place many decades before the Directive came into force, though some drainage has been more recent and there will likely be future calls for drainage. Very little of area of the habitat is likely to have been lost since the previous reporting period, and the favourable reference area is taken to be the current area. Some losses of potential turloughs have not been considered as there is little evidence to suggest that the sites would ever have qualifed as turlough habitat. For these reasons area is assessed as Favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Turlough structure and function are considered as unfavourable - inadequate. While some turloughs appear to be in excellent ecological condition with no obvious pressures (e.g. Lough Gealain, Co. Clare), others are impacted by drainage, groundwater Phosphorus enrichment and intensive grazing with negative effects on their ecological structure and function. A small number of turloughs have had significant damage (mostly prior to this reporting period) through ground clearance which has considerably altered the ecological communities present. Overall the habitat is unfavourable (inadequate).
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	In 2007 turlough structure and function was considered unfavourable – inadequate. Since that assessment there has been an increased amount of field-work carried out on turloughs, resulting in improved ecological understanding. While some turloughs are individually in poor conservation status (see 2.7.4 above), this seems to be a minority of locations (2 out of 22 turloughs). The ecological status of turloughs does not seem to have changed significantly during the reporting period. Major trends in groundwater pollution from P (and N) appear in general to show slight improvement in water quality since the last reporting period (McGarrigle et al., 2010; EPA, 2012; O'Sullivan, 2012), the same is true for lakes. This implies that pollution pressures on turloughs may have decreased slightly in recent times. No significant drainage of turloughs appears to have taken place in the last reporting period. There is some evidence of the spread of some favourable vegetation types – woodland, for example – since 1992 in several turloughs, and also recovery of some vegetation communities typical of highly poached ground caused by high densities of grazing animals; these trends tend to suggest a slight decline in grazing pressure in several turloughs. However several turloughs still face pressures from nutrient enrichment and intense grazing. The ecological structure and function is therefore considered to be stable.

Field label	Note
Habitat code: 3180	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As mentioned in 2.8.3 b, pressures since the previous reporting period have declined slightly in many turloughs, though in a small number of cases these pressures are known to have increased. In addition, there are renewed calls for drainage of turloughs; if such drainage only removes extreme flood water (eg once in a decade or more high levels) it will be unlikely to have significant impact on the conservation status of turloughs, but some suggestions have included lowering of normal flood levels. In addition some turloughs are threatened by adjacent road development, with associated run off as well as disruption of hydrological function. The Irish Government's Food Harvest 2020 (Department of Agriculture, Fisheries & Food, 2010) is likely to lead to some agricultural intensification, potentially placing future pressures on turlough grazing. There is some shift towards conversion of grasslands to maize crops in the zone of groundwater contribution to some turloughs, and if this involves conversion of unimproved pasture there are likely to be groundwater impacts due to fertiliser and pesticide diffuse pollution sources. Thus despite the general trends in slight improvements in groundwater quality (see 2.8.3 b), there are likely increased threats to turloughs especially as many have considerable areas of high or extreme pathway susceptibility due to the karst nature of the landscape. Turloughs generally also face threats due to increased precipitation which may be linked to climate change, and also by the lack of maintenance of stone walls and other boundaries within turloughs which may lead to greater homogenisation of land parcels within turloughs. For all these reasons, the future prospects were assessed as Unfavourable (inadequate).
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	In 2007 the future prospects were also considered Unfavourable (inadequate). For those turloughs within the SAC network (and where those SACs have turloughs specifically listed as a qualifying feature), there is reason to assume that turloughs will be protected from alteration of the hydrological regime. However many turloughs (mostly smaller ones, and perhaps those of lower current conservation value – though these might be suitable for restoration) remain outside of the SAC network, and hence are likely more vulnerable to activities which may impair their ecological structure and functioning. There are however some likely increased threats to turloughs generally through probable agricultural intensification as a result of Ireland's Food Harvest 2020; this may lead to increased nutrient inputs and possibly increased grazing in all but the most oligotrophic turloughs. Maintenance or improvements in turlough water quality expecially for the more oligotrophic turloughs, will be closely linked to the successful implementation of the WFD. Where the problem is diffuse pollution in the catchment, the improvements would be dependent on the development and implementation of turlough-specific sub-basin plans. These would take a significant time to develop and implement, and therefore no significant improvement is expected in the immediate future. For these reasons the qualifier has been set as stable.
2.8.05 Overall assessment of Conservation Status	There is no evidence of any significant change to the range or area of turlough habitat. The ecological structure and function is considered to be unfavourable - inadequate, though perhaps only just outside of favourable. The future prospects are considered to be slightly unfavourable, with numerous low or medium impact threats which would add to current pressures, but would likely not be of sufficient impact to make future prospects unfavourable – bad. Therefore the overall assessment is Unfavourable inadequate.
2.8.06 Overall trend in Conservation Status	See field 2.8.5. There is unlikely to have been a significant decline in condition or any change in the immediate future, therefore the Overall assessment trend is considered to be stable.
3.1.02 Method used	The estimated area within the SAC network was calculated.

Field label	Note
Habitat code: 3180	
3.1.03 Trend of surface area within the network	The trend for area is considered to be in line with the national trend.
3.2 Conservation measures	Turloughs listed as qualifying interests in 45 SACs are protected by the 2011 Habitat Regulations which regulate any plans or projects either on site or in their catchments areas that may negatively impact on the conservation objectives for the habitat (Article 6 (3)). There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Currently there are no specific measures being undertaken to restore or enhance the habitat in SACs. The habitat is afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality especially for water dependant sites on the Register of Protected Areas. As turloughs are Groundwater Dependant Terrestrial Ecosystems (GWDTEs) and, those which are qualifying interests in SACs, are listed in the Register of Protected Areas, the protection and, where necessary, the restoration of their surface and groundwater supply and quality is an objective of the River Basin Management Plans. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters and ground waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. The current RBMP measures are likely to be insufficient to protect the more oligotrophic turlough habitat, for a number of reasons, most notably: 1. If high status is required for the more oligotrophic turloughs then the general WFD objective of good status will not allow for maintenance or restoration of such sites. 2. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the maintainence or restoration of the oligotrophic turloughs, especially those in the more intensive agricultural areas. It is assumed that current and future RBMP cycles will lead to a gradual reduction in pressures from domestic on-site and municipal wastewaters. It is likely that maintenance or restoration of the necessary water quality supply to at least some turloughs will require dedicated Sub-basin Management Plans with more stringent objectives and specific measures to address catchment-specific pressures, particularly diffuse pollution from agriculture. Outside SACs and NHA some protection for turloughs is provided by the Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities (Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011 which require planning consent for any drainage or reclamation work that has the potential to impact an area of wetland of 0.1 ha or greater. EIA is mandatory under these Regulations where a wetland area of 2 ha or more could be affected. EIA and AA are also required for smaller areas of wetland, where the works would have a significant effect on the environment.

Turloughs (3180)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
28-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3260

NAME: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on expert opinion with no or minimal sampling (1)
1.1.3 Year or period	2000-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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Hatton-Ellis TW,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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Life in UK Rivers (2003) Monitoring Watercourses Characterised by Ranunculion

fluitantis and Callitricho-Batrachion Vegetation Communitites. Conserving Natura 2000 Rivers Monitoring Series No 11, English Nature, Peterborough.
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McGarrigle ML, Bowman JJ, Clabby KJ, Lucey J, Cunningham P, MacCarthaigh M, Keegan M, Cantrell B, Lehane M, Clenaghan M,Toner PF (2002) Water Quality in Ireland 1998-2000. EPA Publications.
McGarrigle, M., Lucey, J and Ó Cinnéide, M. (2010) Water Quality in Ireland 2007-2009. Environmental Protection Agency, Wexford.
Ní Chatháin, B., Moorkens, E. and Irvine, K. (2013) Management Strategies for the Protection of High Status Water Bodies. 010-W-DS-3. Strive Report Series No. 99. EPA, Wexford.
Preston, C.D. (2003) Pondweeds of Great Britain and Ireland. BSBI Handbook, No. 8, Botanical Society of the British Isles, London.
Preston, C.D. and Croft, J.M. (2001) Aquatic Plants in Britain and Ireland. Harley Books, Colchester.
Preston, C.D., Pearman, D.A. and Dines, T.D. (eds) (2002) New Atlas of the British & Irish flora. Oxford University Press, Oxford.
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White J, Doyle GJ (1982) The vegetation of Ireland: a catalogue raisonné. Journal of Life Sciences, Royal Dublin Society, 3, 289-368.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	82200	
2.3.2 Range method used	Estimate based on expert opinion with no or minimal sampling (1)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	82200
	operator	N/A
	unknown	No
	method	The current Range is considered to represent the Favourable Reference Range (FRR). Future refinement of the definition of the habitat to take into account the important sub-communities is likely to result in a change of the Range and FRR in the future.
2.3.10 Reason for change	Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	234.9		
2.4.2 Year or period	2012-2012		
2.4.3 Method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period	1989-2012		
2.4.9 Long-term trend direction	stable (0)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		

2.4.12 Favourable reference area	area (km)	234.9
	operator	N/A
	unknown	No
	method	The current Area is considered to represent the Favourable Reference Area (FRA). Future refinement of the definition of the habitat to take into account the important sub-communities is likely to result in a change of the Area and FRA in the future.
2.4.13 Reason for change	Improved knowledge/more accurate data	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	medium importance (M)	Mixed pollutants (X)
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	medium importance (M)	Mixed pollutants (X)

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Ranunculus trichophyllus
Ranunculus penicillatus
Ranunculus peltatus
Ranunculus aquatilis
Myriophyllum spp.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Callitriche spp.
Sium erectum
Zannichellia palustris
Potamogeton spp.
Fontinalis antipyretica

2.7.2 Species method used	The plants characteristic of the habitat are listed in the Interpretation Manual (EC, 2003) and include a number of Ranunculus species and all Callitriche species, including other submerged aquatic plants. The vegetation has been further defined in a British context and consists of 7 different groupings (Hatton-Ellis and Grieve 2003). The community Callitricho–Batrachion is described in White and Doyle (White and Doyle 1982) and includes species of the Ranunculus subgenus Batrachium and two species of Callitriche, C. hamulata and C. platycarpa as diagnostic species. There are few published records for descriptions of this habitat in Ireland and no comprehensive island-wide descriptions. No specific assessments of typical species have been undertaken to date.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	The EU (2003) definition of this habitat is very broad, especially when the presence of aquatic mosses is taken into account. Using this broad definition the habitat will be found in most watercourses in Ireland. Despite work by Kelleher (2011), there is to date no satisfactory definition of the habitat and its sub-types or their distribution in Ireland. Consequently there is a lack of relevant monitoring data concerning the habitat. What is clear is that the habitat can occur over a wide range of physical conditions, from acid, oligotrophic, flashy upland streams dominated by bryophytes to more eutrophic, slow flowing streams dominated by Ranunculus and Callitriche species. While the former will be sensitive to diffuse pollution the latter, especially in shallow streams, will be relatively more resistant. The EPA has highlighted the decline in high quality rivers sites (i.e. Q5 and Q4-5 sites) between 1987 and 2008. (Lucey, 2009). An EPA-sponsored research study further analysed these trends in high status water bodies over time (Ní Chatháin et al., 2013). Ní Chatháin et al. (2013) documented a steady decline in monitored high status river sites from 41% in 1998-2000, to 37% in 2001-2003, 31% in 2004-2006, and 27% in 2007-2009. Even allowing for a reduction in the number of river sites monitored, this represented a loss of 280 high status sites between 1998 and 2009 (this is an adjusted figure - the actual reduction in the number of sites achieving Q5/Q4-5 was 369) (Ní Chatháin et al., 2013). Status was based on macroinvertebrate monitoring and included both Q5 and Q4-5 sites (Ní Chatháin et al., 2013). Only 41 of the 407 river sites classified as at high status for the 2007-2009 monitoring period were at Q5 (366 at Q4-5), again indicative of the deterioration in the highest quality river sites (Ní Chatháin et al., 2013). Such declines will have implications for the status of the most oligotrophic sub-types of 3260 and are the basis for assessing the habitat as inadequate The area of habitat listed as Qualifying Interest within the SAC network is 17.29km2.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	32.46	max	32.46
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Enhance Long term

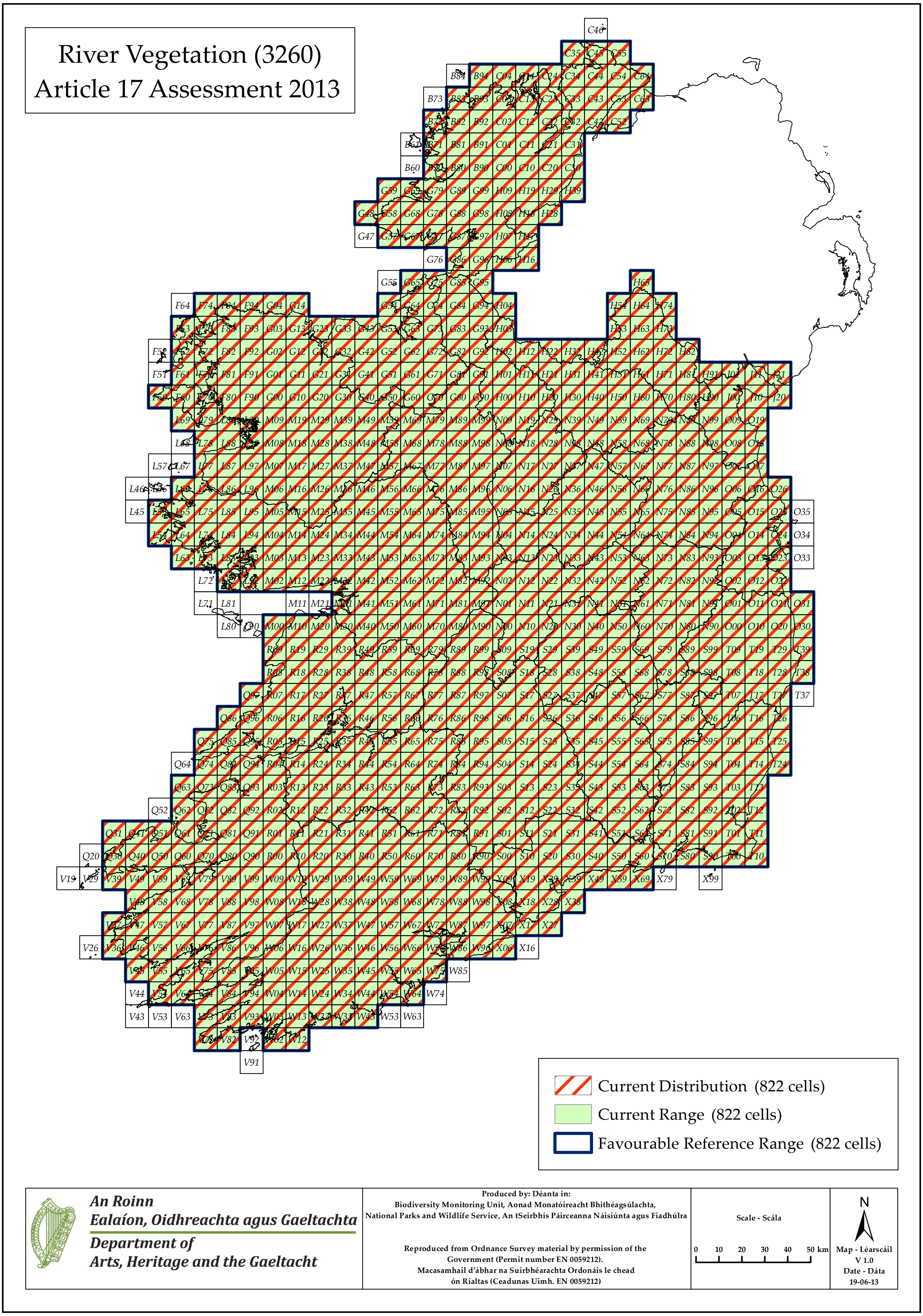
Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 3260	
0.2 Habitat code	The description of habitat 3260 is broad, covering rivers from upland bryophyte and macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts (European Commission, 2007, Hatton-Ellis and Grieve, 2003). Selection of Special Areas of Conservation for the habitat in Ireland has used this broad interpretation. Thus, it must be recognised that a number of sub-types of this habitat exist in Ireland. As in the UK, it is considered that the habitat as defined is too broad for a single set of conservation guidelines to cover it (Hatton-Ellis and Grieve, 2003).
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.
1.1.02 Method used - map	The distribution of habitat 3260 in Ireland was based on mapped rivers. The “WFD_RiverSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb, Version Oct 2011) was used. This feature class contained 93,555 separate polylines. 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 10 km squares. Rivers are distributed across all counties. The only 10 km squares in which rivers do not occur are those with small areas of coastal or island land. The distribution is based on the occurrence of rivers, not of a particular type of river vegetation or river habitat.
1.1.02 Method used - map	The distribution was based on the total length of mapped river channels in the WFD Geodatabase. These river segments are mapped at 1:50,000 scale.
1.1.03 Year or period	The distribution was based on the “WFD_RiverSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The river segment vectors are at 1:50,000 scale and based on the 2000 OSi Orthophotographs.
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	The range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps. The recommended Range Tool was not used as the the distribution covered the vast majority of the terrestrial grid.
2.3.02 Method used - Range	The distribution was used as the range. The distribution was based on the occurrence of rivers. See 1.1.2, 1.1.4 and 1.1.5 above for further information.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.04 Short term trend - Trend direction	There is no evidence of a loss of Range of rivers over the last 12 years.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.07 Long-term trend - Trend direction	There is no evidence of a loss of Range of rivers over the last 24 years.
2.3.10 c) Reason for change - use of different method	Only the current distribution was used to derive range as opposed to a range envelope derived using a set of standardised rules in 2007.

Field label	Note
Habitat code: 3260	
2.4.01 Surface area	The extent of 3260 is based on the extent of all rivers. The exact width of the river channels is not systematically recorded, although the Central Fisheries Board (2002 and unpublished revision 2012) has estimated the width of the channels on the basis of a statistical model that relates channel width to catchment area and stream network metrics. This model indicates an approximate habitat area for 3260 of 234 km2.
2.4.02 Year or period	The wetted width figures are based on predictive modelling completed in 2012. IFI predicted wetted width was based on the deEyto et al. method, using shreve link magnitude and catchment area
2.4.04 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.4.05 Short-term trend - Trend direction	There is no evidence of a loss of Area of rivers over the last 12 years.
2.4.08 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.4.09 Long-term trend - Trend direction	There is no evidence of a loss of Area of rivers over the last 24 years.
2.5 Main pressures	The list of pressures was based largely on the 2007-2009 EPA monitoring period (McGarrigle, et al., 2010).
2.6 Main threats	All pressures documented at 2.5 were also listed as threats as there is no evidence these pressures will cease in the immediate future.
2.7.04 Structure and functions - Methods used	Between 2007-2009 biological assessments were made by the EPA at almost 2,500 river sites and assessment of the supporting physico-chemical parameters, including nitrate, phosphate, BOD and ammonia was undertaken by local authorities and the EPA at over 1,700 river sites. A core group of 180 representative surveillance monitoring sites was also sampled for a full suite of quality elements. These data, together with the analysis undertaken by Ní Chatháin et al. (2013) were consulted to infer the quality of the habitat.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As there has been no change in Range since the Directive came into force and all geographical variation is accounted for, Range is assessed as Favourable. Further research needs to be carried out on the important sub-communities within this habitat type to determine whether any communities are restricted geographically.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As there has been no change in Area since the Directive came into force and the Area covered is considered adeaquate to ensure the long term survival of the habitat, Area is assessed as Favourable. Further research needs to be carried out on the important sub-communities within this habitat type to determine whether the extent of any of the communities is threatened.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	20% of the rivers monitored by the EPA during the reporting period (McGarrigle et al., 2010) were in poor or bad status, therefore structure and functions is assessed as unfavourable inadequate.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	A declining qualifier is assigned to reflect the ongoing deterioration of the higher quality sites (Ní Chatháin et al., 2013).

Field label	Note
Habitat code: 3260	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. A number of important WFD measures are likely to contribute to the protection of and improvements in rivers, particularly national investment in municipal wastewater treatment and regulation of such discharges by the EPA, and the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS). These measures should, with time, lead to reductions in pollutant losses from municipal wastewaters and once-off houses. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. The current RBMP measures are likely to be insufficient to protect habitat 3260, however, for a number of reasons, most notably: The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status in areas of Ireland with high rainfall and/or organic soils. The majority of phosphorus lost to waters has an agricultural origin, accounting for 47% of polluted rivers sites (McGarrigle et al., 2010) there is significant concern that the current agricultural measures may not succeed in preventing further deterioration of river water quality. The recent state of the Environment reports states: "The development strategy for the agriculture sector, Food Harvest 2020 (DAFF, 2010) proposes a 50% increase in milk production by 2020. While environmental sustainability is a key underlying principle of Food Harvest 2020, the milk production targets will present a significant challenge to meeting WFD objectives." (Lehane and O'Leary, 2012) There are currently no RBMP measures to address drainage or other degradation of peatland and the resultant water quality problems. Conservation actions to rehabilitate and restore blanket bogs and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some River basins, however, economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural reclamation of peat and peaty soils is ongoing in the west, in particular. These considerations combined with the current status of the habitat's structure and functions, on-going pressures mean that the future prospects are considered Unfavourable inadequate.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Due to ongoing efforts under the WFD the qualifier is set as stable.

Field label	Note
Habitat code: 3260	
2.8.05 Overall assessment of Conservation Status	The main problems for river habitats in Ireland are damage through eutrophication and other processes linked to water pollution, rather than direct habitat loss and destruction. Consequently, the conservation status of the range and area of habitat 3260 were assessed as favourable. WFD water quality data of habitat 3260 was conducted between 2007-2009 demonstrated that 20% of the area of the habitat within Ireland is in poor or bad condition. Nutrient and organic losses from agriculture and municipal and industrial discharges are the most significant pressures and threats. While significant measures are being implemented to address pollution from regulated discharges and domestic wastewater systems, action to reduce losses from agriculture, the largest source of phosphorus to water is considered inadequate and there are currently no measures to address the impacts of peatland drainage and general degradation. Despite the issues relating to river water quality, many vegetation communities within this habitat type are considered to be tolerant to moderate levels of pollution, therefore an overall Unfavourable inadequate assessment is given.
3.1.03 Trend of surface area within the network	As the national trend for the area of the habitat is stable, the trend within the Natura 2000 network is also stable.
3.2 Conservation measures	The habitat is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for habitat 3260 in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. The Programmes of Measures (Measure 4.1) under the WFD River Basin Management Plans will help improve water quality generally; however, their focus is on improvement of poor quality rather than maintenance or restoration of the highest quality.


River Vegetation (3260)
Article 17 Assessment 2013
Current Distribution (822 cells)
Current Range (822 cells)
Favourable Reference Range (822 cells)
An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht
Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
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Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)
Scale - Scála
0 10 20 30 40 50 km
N
Map - Léarscáil
V 1.0
Date - Dáta
19-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 3270

NAME: Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1983-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Conaghan, J., Roden, C. and 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.
Goodwillie, R.N. (1992) Turloughs over 10ha: Vegetation survey and evaluation. Unpublished Report to the National Parks and Wildlife Service.
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
NPWS (2007) Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation (3270): Conservation Status Assessment Report. In: The Status of EU protected Habitats and Species in Ireland, Volume 2. Unpublished Report to the National Parks and Wildlife Service. Pp 1330-1342. http://www.npws.ie/publications/euconservationstatus/
Goodwillie, R., Heery, S. and 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.
Sharkey, N., Murphy, M., Kimberley, S., O'Rourke, A. & Waldren, S. (2013). Turlough Ecological and Conservation Assessment, Chapter 7: Turlough Vegetation – Decsription, Mapping and Ecology; pp 318.
Waldren, S., Allott, N., Coxon, C., Gill, L., Irvine, K., Johnston, P. & Kimberley, S. (2013). Turlough Ecological and Conservation Assessment, Chapter 13: Summary and Recommendation; in prep.
Conaghan, J., Roden, C. and 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., Heery, S. and 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.
McGough, H.N. (1983) Field trip to the Gearagh, Macroom, Co. Cork 19-21 August, 1983. Bulletin Irish biogeographical Society 7: 55-57.

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 15: 27-35.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	1600	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	1600
	operator	N/A
	unknown	No
	method	As there is no evidence of a decline of Range since the Directive came into force and there is no reason to assume that the area of the Range is not large enough to allow the long term survival of the habitat, the current range is set as the Favourable reference range.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.24		
2.4.2 Year or period	1983-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	1.24	
	operator	N/A	
	unknown	No	
	method	As there is no evidence of any significant decline in extent since the Directive came into force the current estimated area is set as the Favourable reference area. This value is approximate as the habitat is dependent on flood duration and its area fluctuates from year to year. Detailed repeat surveys would be required to establish the relationship between these fluctuations in area and hydrological factors.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Atriplex prostrata
Bidens tripartita
Callitriche palustris
Chenopodium rubrum
Eleocharis acicularis
Gnaphalium uliginosum
Juncus bufonius
Limosella aquatica
Persicaria hydropiper
Persicaria minor
Riccia cavernosa
Riccia sp
Rorippa islandica
Rorippa palustris
Alopecurus aequalis

2.7.2 Species method used

A review of the NPWS (2007) list was undertaken. Characteristic species for the Goodwillie (1992) “Wet annual” community were considered together with species associated with scarce/rare species that occur in this habitat (Conaghan et al. 2006). Atypical or negative indicator species were removed from the final list of typical species and associated species. Positive indicators species are asterixed.

Typical species: Atriplex prostrata, Bidens tripartita, Callitriche palustris*, Chenopodium rubrum, Eleocharis acicularis*, Gnaphalium uliginosum, Juncus bufonius, Limosella aquatica*, Persicaria hydropiper, Persicaria minor*, Riccia cavernosa*, Riccia sp., Rorippa islandica*, Rorippa palustris, Alopecurus aequalis*

	Associated species: Atriplex patula, Callitriche sp., Callitriche stagnalis, Equisetum palustre, Lythrum portula, Mentha aquatica, Myriophyllum verticillatum, Nasturtium officinale, Oenanthe aquatica, Persicaria maculosa, Plantago major, Poa annua, Polygonum arenastrum, Polygonum aviculare, Ranunculus circinatus, Ranunculus trichophyllus, Sparganium emersum, Stellaria media, Veronica scutellata, There is no targeted monitoring programme for this habitat; however the presence of Eleocharis acicularis (on mineral soils), Limosella aquatica and Rorippa islandica was given a positive score for a subsample of turloughs monitored by Waldren et al. (2013).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	0.25km2 are listed as a qualifying feature within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Favourable (FV)
	qualifiers	N/A
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status	Favourable (FV)	
2.8.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1.13	max	1.13
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Maintain

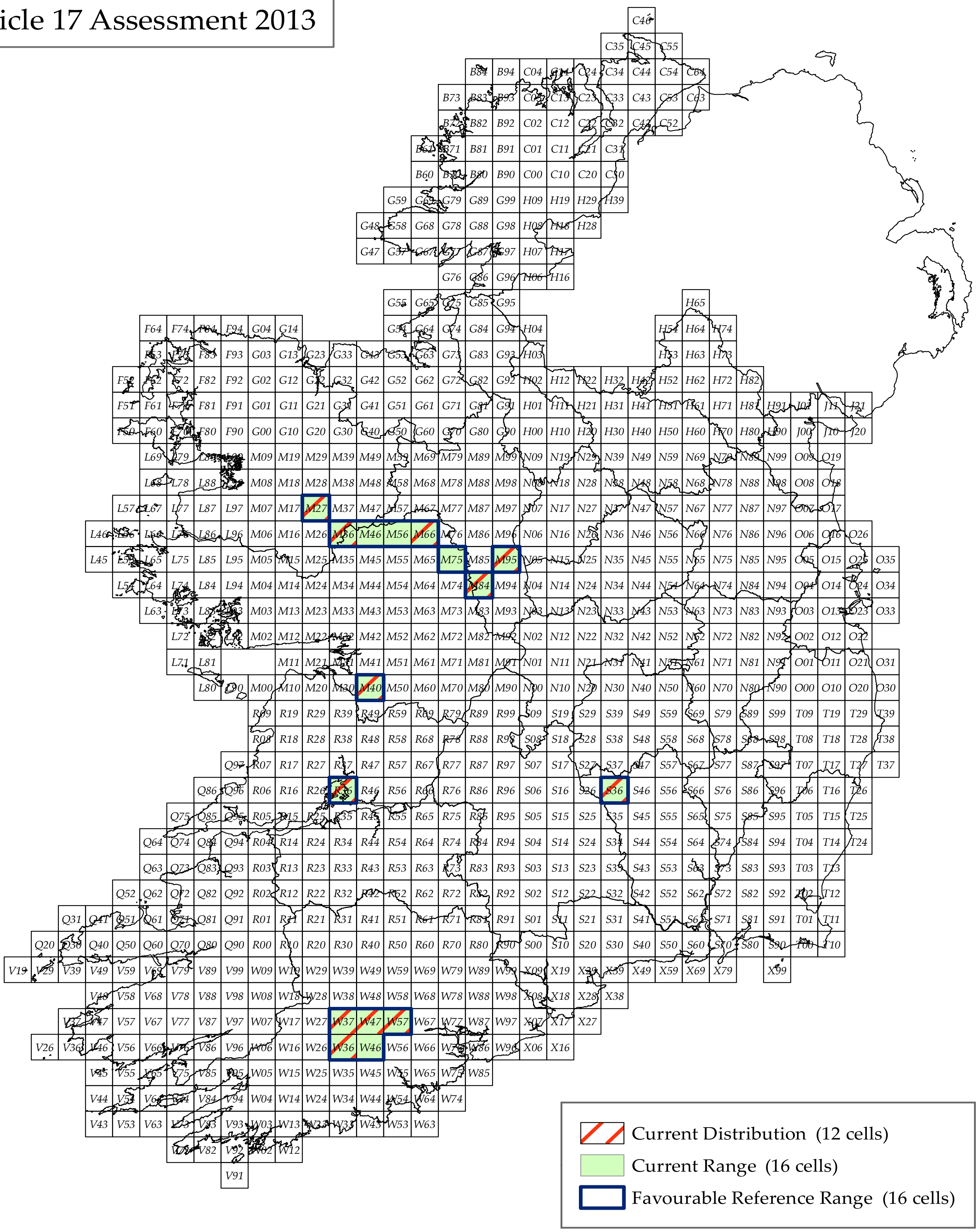
Field label	Note
Habitat code: 3270	
0.2 Habitat code	In Ireland this habitat is primarily found in riverine turloughs where the flood water recedes relatively late and in areas prone to summer flooding. This dynamic habitat is found on damp, fine, mineral soils (typically alluvial muds). Typical species are small, short-lived, fast-growing annuals that are poor competitors. They occupy this habitat because it is exposed for too short a time and too late in the growing season for perennial species to complete their life cycles. The ongoing development of this habitat depends on a continuous supply of fine sediment. This sediment may be derived from external sources or through erosion, suspension and re-deposition of silt within the immediate vicinity of the habitat. Most sites are fed by streams or large underground conduits that supply a significant fine sediment load to the habitat. Wave action can lead to erosion, re-suspension and subsequent deposition of sediment within a basin.
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.4.
1.1.02 Method used - map	The NPWS (2007) assessment was reviewed internally. 12 turloughs are considered to support the habitat and one River location. The habitat is widespread at the river location, the Gearagh, County Cork extending for approximately 46 km of shoreline within four 10 kilometre squares (O'Mahony, 2002). Recent surveys of a subsample of three of the turlough sites undertaken by TCD (Sharkey, 2012) were checked to ensure the habitat still exists. Grid references were derived for the sites and not necessarily the exact location of the habitat.
1.1.03 Year or period	1983-2012: This period captures the Irish Biogeographical field trip to the Gearagh (McGough, 1983, FitzGerald, 1984), survey of the Gearagh and Lee Reservoir by Tony O'Mahony (O'Mahony, 1986, 2002), the Goodwillie (1992) turlough survey, the Gort Flood Study (Goodwillie, 1997), the TCD 2008-2012 Turlough project and internal NPWS internal reports on this habitat.
1.1.04 Additional distribution map	The site locations referred to in 1.1.2 were intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the maps referred to in 1.1.1 and 1.1.4 using the recommended Range tool.
2.2 Published sources	The publications listed were consulted to refine the definition and location of the habitat and also to gain insight into any potential pressures and threats. Most of the publications are related to turloughs rather than river floodplains. Sharkey et al. (2013) and Waldren et al. (2013) refer to draft chapters from an interdisciplinary study on turlough ecology are being carried out by TCD since 2006. This study is referred to as the "TCD study" throughout this assessment. Most of the fieldwork undertaken during the TCD study was completed between 2006 and 2010.
2.3.01 Surface area - Range	This figure has been derived from the ING range map referred to in 1.1.5.
2.3.02 Method used - Range	The explanation for this field has been covered in sections 1.1.2 & 1.1.4.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The TCD study did not show any loss of the presence of the habitat at selected sites from site visits referred to in Goodwillie (1992) or any internal NPWS site visits. This suggests that there has been no change in range since 2001.

Field label	Note
Habitat code: 3270	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Three turlough sites were dropped from the 2007 list as an internal review by the NPWS determined that the habitat was not present. A vegetation community similar to 3270 can develop in response to cattle poaching and trampling in the absence of any hydrological driver. This widespread community is considered to be of little conservation importance as it does not contain the rare and typical species of habitat 3270 and is associated with soil disturbance and enrichment. This vegetation community, rather than true habitat 3270, was found at the three turloughs. Only those sites where habitat 3270, as defined by its typical species (2.7), occurs as a natural component (i.e. owing to a hydrological driver and sediment supply/movement mechanism) were mapped in the distribution. Five sites were added to the 2007 list following consideration of rare plant characteristic species from Conaghan et al. (2006).
2.3.10 c) Reason for change - use of different method	The range tool also resulted in a modified Range area.
2.4.01 Surface area	The areas assigned to individual turlough sites in the NPWS (2007) assessment were maintained. For the additional sites the area covered by communities 8B – Wet annuals and 9B – Eleocharis acicularis derived from Goodwillie (1992) were summed. Expert judgement, othophotography and satellite imagery (Bing Maps) was used for Hawkhill turlough. The areas derived for the six sites at the Gearagh/Lee Reservoir were based on a combination of published sources, othophotography and satellite imagery (Bing Maps) and expert judgement. The final national area for the habitat is approximate as this habitat is very dynamic, dependent on flood duration, the timing of flood recession and sediment supply or movement. The habitat naturally has significant inter-annual variations in area and, in some years, may not develop at all owing to extended or persistent flooding. Future surveys may refine the extent of this habitat.
2.4.02 Year or period	The period specified in 1.1.3 was used together with estimations of habitat extent from Bing maps.
2.4.03 Method used - Area covered by habitat	See field 2.4.1
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	Expert judgement has been used to determine the stable trend. This habitat is dependent on flood duration and the area may fluctuate from year to year. There is no evidence to suggest any considerable expansions or contractions in area.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The changes in the mapped distribution of this habitat (described in 2.3.10b), combined with additional information in the published accounts on the extent of the habitat at the sites, resulted in a change in the estimated area.
2.4.13 c) Reason for change - use of different method	A combination of reported areas of vegetation communities and review of orthophotography and satellite imagery using expert judgement was used to estimate the area figure.
2.5 Main pressures	Localised enrichment of this habitat can occur as a result of agricultural activities within turloughs and surrounding topographical basins. Excessive poaching can reduce the extent and quality of the habitat. Three turloughs containing this habitat were surveyed by the TCD study. “H02.06 Diffuse groundwater pollution due to agricultural and forestry activities” and “A04.01.01 Intensive cattle grazing” occurred at these sites both of which are listed but given a low importance. Drainage was listed as a pressure in the 2007 submission, however it is not currently impacting these sites.

Field label	Note
Habitat code: 3270	
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures, the list is the same for threats. Drainage (J02) and climate change (M01) are also listed as threats. Drainage is a threat for turloughs, especially those outside of the Natura 2000 network, that may increase with climate change in response to increased extent or frequency of flooding. Two of the twelve turloughs with habitat 3270 are outside of the SAC network. Although a disturbance-driven habitat and associated with natural fluctuations in water level, climate change has potential to impact negatively on 3270. Increased summer storms (M01.03) could result in permanent flooding of the potential habitat. Conversely, higher summer temperatures could increase evapotranspiration (M01.01, M01.02) and lead to earlier drying of the potential habitat and increased competition from perennial species. The impacts of climate change are likely to vary regionally and may even be site-specific.
2.7.04 Structure and functions - Methods used	Three of the turloughs harbouring this habitat that were part of the TCD study reported impacts from nutrient input; however the communities that represent this habitat appear to be persisting. Orthophotography, satellite imagery and expert judgement were used to extrapolate this outcome to other sites. There is no evidence of a loss of any of the scarce/rare species associated with this habitat. The habitat is flooded for an extended period of time, becoming exposed in May/June and allowing the short-lived, annual typical species to grow, while preventing perennial species from completing their lifecycles. Data for the habitat at Coole indicates the habitat is continuously flooded for around 250 days/year (Owen Naughton pers. comm.). While the habitat must flood at least once per year, it is likely that a second, summer flood is required at lower frequency (perhaps once every five years) in order to exclude perennials. The depth of water level fluctuations (likely to be from 2 m up to 6 m plus) and average water depth during flooding may also be significant factors in limiting the colonisation of the habitat by perennial species. This dynamic habitat is found on damp, fine, mineral soils (typically alluvial muds). When floodwaters recede, relatively fertile, bare mud is exposed and rapidly colonised. The ongoing development of the habitat depends on a continuous supply of fine sediment. This sediment may be derived from an external source or through erosion, suspension and re-deposition of silt within the immediate area of the community. Most sites are fed by streams or underground conduits that supply a significant fine sediment load to the habitat. Wave action can lead to erosion, re-suspension and subsequent deposition of sediment within a basin. Suspended sediment also reduces underwater light levels and restricts the growth of perennial species. The soils usually remain saturated for a significant period of time after they become exposed, which allows the characteristic species to become established, but may dry out showing superficial cracking later on in the summer. Moisture is retained in the soils through a combination of local water table level and the water retention capacity/permeability of the soils.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for this habitat is concentrated west of the Shannon and along the Lee, with an outlying area in Kilkenny. There is no evidence of a decline in range since the Directive came into force and all geographical variation is considered to be represented. For these reasons range is assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The approximate area for this habitat is estimated as 1.24 km2. Due to the dynamic nature of the habitat this value is likely to fluctuate. There is no evidence of a decline in area since the Directive came into force. For this reason Area is assessed as Favourable.

Field label	Note
Habitat code: 3270	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure & Functions are assessed as Favourable as there is no evidence to suggest that the pressures listed are impacting the structure or functioning of the habitat.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The low importance of the threats suggest that this habitat is likely to remain viable into the future, therefore future prospects is assessed as favourable.
2.8.05 Overall assessment of Conservation Status	As there is no evidence of decline, Range and Area are assessed as Favourable. Ecological data examined indirectly from a small sample of turloughs suggest that the pressures are not impacting the typical species or the functioning of the habitat; therefore the structure & functions and future prospects and the overall assessment is assessed as favourable. More detailed survey work is required to refine the extent of the habitat and investigate the impacts of nutrient enrichment and trampling by cattle.
3.1.01 a) Surface area - Minimum	All turlough sites except Rathbaun and Ballyglass are within the SAC network. Only one of the six Lee sites (the Gearagh/Lee Reservoir) is in the Gearagh SAC (Site Code 000108), however this site has the largest area of the habitat (40 ha). The estimated area within the Natura 2000 network is 1.13 km2.
3.1.01 b) Surface area - Maximum	The same value is given for min and max.
3.1.03 Trend of surface area within the network	As the national trend is stable, the trend within the network is also considered to be stable.
3.2 Conservation measures	Where this habitat is listed as qualifying feature in SACs it is protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of this habitat is regulated under the Environment Liability Regulations 2008. Some species that occur in this habitat are also protected by the Flora (Protection) Order, 1999 (S.I. No. 94 of 1999).

Chenopodion rubri (3270)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
21-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 4010

NAME: Northern Atlantic wet heaths with Erica tetralix

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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. (2006) County Waterford survey of 21 wetlands. Unpublished report by Natura Environmental Consultants for Waterford 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. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

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2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	57100	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	57100
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1429.66		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	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. Whilst this figure is unknown it is deemed to be more than the current area due to declines in the intervening period. Losses are unlikely to have been more than 10% of the FRA however.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
hand cutting of peat (C01.03.01)	low importance (L)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	low importance (L)	N/A
Erosion (K01.01)	high importance (H)	N/A
damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A

2.5.1 Method used – pressures   mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
hand cutting of peat (C01.03.01)	low importance (L)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)

invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	low importance (L)	N/A
Erosion (K01.01)	high importance (H)	N/A
damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

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
Succisa pratensis
Trichophorum germanicum

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop cover of indicator species needed to be at least 50%. As this was a baseline survey, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)

2.7.5 Other relevant information	Area of habitat within SAC network = 771.51 km2 Area of habitat outside SAC network = 658.15 km2 Area of habitat within SAC network that is QI = 608.25 km2 Area of habitat within SAC network that is not QI = 163.26 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	771.51	max	771.51
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)		medium importance (M)	Both	
Maintaining grasslands and other open habitats (2.1)	Administrative	high importance (H)	Both	Enhance
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	No effect
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Regulation/ Management of hunting and taking (7.1)	Administrative	low importance (L)	Inside	Enhance

Field label	Note
Habitat code: 4010	
0.2 Habitat code	Habitat 4010 Wet heath has been defined in an Irish context by Perrin et al. (2013a). It is a highly variable 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 less than 50 cm deep). It is dominated by a mixture of Molinia caerulea, Erica tetralix, Trichophorum germanicum or Calluna vulgaris, although not all of these species need to be present. Dwarf shrubs may be scarce or absent in degraded examples of wet heath characterised by dominance of Trichophorum germanicum or Molinia caerulea.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat is widespread across the country, particularly in the west, but is absent from significant areas of the north midlands.

Field label	Note
Habitat code: 4010	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4010, Fossitt code HH3 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Ahascragh road AA. GIS files for this project were made available by Galway County Council. Ballycroy National Park Habitat Map. An NPWS project which compiled habitat data from available information. Datasets used were from 1991-2009. Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). Blarney Electoral District habitat survey. A Cork County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (O'Donoghue et al. 2008). Burren National Park Habitat Map. An NPWS habitat mapping project. Habitat information is based on a broad habitat map of the wider Burren area, which was prepared in 2006, together with other maps of varying ages. Carlow Pilot Habitat Mapping Project. GIS files for this Carlow County Council habitat survey were available. Cavan Habitat Map. A Cavan County Council habitat survey (Kearney 2010). Habitat information is derived from aerial photographic interpretation with targeted field surveys. Cavan Wetland Survey. GIS files for this Cavan County Council habitat survey were available. Clare Wetland Survey. A Clare County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Crushell and Foss 2008). Commonage Framework Plans (CFP). An NPWS/Dept of Agriculture project providing the location of commonage areas and the habitats recorded. A widespread dataset covering over 4,400 km^2. Anon (1998) is a manual for the preparation of commonage framework plans. In the 2007 report, 78 CFP records of wet heath centred on eastern Galway were excluded. These records were also excluded from the current distribution. 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. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura 2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied.

Field label	Note
Habitat code: 4010	

Ecological study of two Donegal Islands. A Donegal County Council project based on field surveys. The report for this project (Anon. 2010) was made available.

Dún Laoghaire Rathdown habitat survey 2011. GIS files for this Dún Laoghaire Rathdown County Council habitat survey of were made available.

Galway City Habitat Inventory. A Galway City County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Anon. 2005).

Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs.

Irish Semi-natural Grassland Survey (ISGS). An NPWS project mapping semi-natural grassland sites and assessing the conservation status of Annex I grassland habitats (Martin et al. 2007, 2008, O'Neill et al. 2009, 2010). Where HH3 had been recorded in the ISGS database as an internal habitat the centroid point for the survey site was entered in the point shapefile as an indication of where the habitat occurred.

Kildare Wetland Survey. A Kildare County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Crushell et al. 2012).

Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron & Perrin 2011).

Laois Habitat Survey. A Laois Heritage Forum habitat survey (Hickey & Tubridy 2009). Habitat information is based on field surveys.

Limestone Pavement Project. An NPWS project mapping and assessing the conservation status of Annex I habitats associated with limestone pavement. The methodology for this survey is detailed in Murphy and Fernández (2009). Habitat information is based on field surveys.

Louth Wetland Survey. A Louth County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Foss et al. 2012).

Mayo Local Area Surveys. GIS files for this Mayo County Council habitat survey of nine towns in Co. Mayo completed by Atkins Ireland were made available.

Midleton Electoral District habitat survey. A Cork County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (O'Donoghue et al. 2011).

Monaghan Wetland Survey. A Monaghan County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Foss & Crushell 2012).

National Juniper Database. An NPWS project recording locations of juniper formations (Cooper et al. 2012). The database included reference to wet heath habitat and the coordinates of these were used.

National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these.

Red Grouse Habitat Survey. An NPWS project assessing the availability of suitable habitat for Red Grouse (Crushell & O'Callaghan 2008). Habitat details for 1 km sample squares were based on field surveys.

South Clare Habitat Map Cratloe to Parteen. GIS files for this project were made available by Clare County Council.

Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available.

Waterford Wetland Survey. A Waterford County Council project which surveyed 21 wetland sites within Co. Waterford (Anon. 2006). Habitat information is based on field surveys.

Wicklow Wetland Survey. A Wicklow County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson and Foss 2011).

Polygons were clipped extensively to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. The boundaries of designated sites which contained the relevant habitat were omitted if more localised datasets (e.g. Commonage Framework Plans and/or Conservation Planning Unit data) had coverage of greater than 50% within the designated site. Boundaries of designated sites were further reviewed to ensure their inclusion would not extend the distribution of the habitat into 10 km grid squares which, following aerial photograph review, were determined not to contain the relevant habitat. Where this occurred designated sites were represented by points rather than polygons. The point shapefile was also used to locate records from the National Juniper Database, Irish Semi-natural Grassland Survey and an Ecological Study of Two Donegal Islands. It also contains points locating pNHA sites for which no polygon shapefiles were available.

The Wicklow Mountains SAC boundary was used in preference to the draft Vegetation and habitat survey of Wicklow Uplands cSAC [O'Donovan G. (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service.]. Data sources which were utilised in the 2007 assessment of this habitat but were not included in this assessment due to concerns about the accuracy with which these datasets can be used to predict the occurrence of 4010 are rainfall data, Alterra [Jongman, R.H.G., Bouwma I.M. & van Doorn, M.A., Indicative map of the pan-European ecological network in western Europe. Alterra, Waginingen 2006]. Corine National Land Cover dataset [EPA (2000). CORINE Land Cover Map 2000] and blanket bog areas from the digitised version of the peatland map of Ireland [Hammond. R.F. (1979) The Peatlands of Ireland. Soil Survey Bulletin No. 35. An Forás Talúntais, Dublin.]. Information compiled in 2000 on the distribution of

Field label	Note
Habitat code: 4010	
	4010 [Conaghan J. (2000) The distribution, on a 10km square basis of selected habitats in the Republic of Ireland. Enviroscope Environmental Consultancy, Galway. Report to Dúchas, The Heritage Service] has been superseded by more recent data.
1.1.03 Year or period	The latest data used are from Phase 3 of the National Survey of Upland Habitats (NSUH) which were collected in 2012. The dates of the original survey work on which theConservation Planning Unit (CPU) Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/ Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing, the latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al. 2013a). Reports have been produced on a site-by-site basis and the habitat has been recorded at each of the sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b 2012a,b, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Berry et al. (2007) is an assessment of the vulnerability of habitats to climate change. Hampton (2008) is a guide to the management of 4010. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 4010 and include important sites for this habitat such Mount Brandon cSAC, Corraun Plateau cSAC and Croaghaun/Slievemore cSAC. The NSUH has so far concentrated mainly on the northwest of the country. The reliability of some data sources may be questioned due to the differences in criteria used to identify the habitat and to differentiate wet heath from dry heath and blanket bog. For example, extensive use was made of data from the CFP which relied heavily on soil depth to determine habitats. In the 2007 report, 78 CFP records of wet heath centred on eastern Galway were excluded. These records were also excluded from the current distribution.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.

Field label	Note
Habitat code: 4010	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 55,400 km2. The main reason for the difference is the use of different data sources. The loss of a few squares from the range is due to the use of more localised records rather than using just designated site boundaries (e.g. along the Shannon Estuary and the River Finn). Some squares were lost from the east of the country as they were based solely on rainfall data. Squares previously included in Cavan were omitted this time as no wet heath was recorded there by the Cavan Habitat Map. Some squares not included in Cork had previously been included purely on the presence of 7130 Blanket bog. Additional squares were brought in from new sources (as listed in 1.1.2).
2.3.10 c) Reason for change - use of different method	The use of the range tool will have contributed to small changes in the range.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution and a point shapefile. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat. For polygons from other sources (e.g. CPU) that mapped specific areas of this habitat, habitat percentages were calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 4010 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. For cSACs with no localised polygon records but for which 4010 is a qualifying interest, the habitat percentage from the Natura 2000 Standard Data Form was used. For other designated sites with no localised polygon records a habitat percentage of 16.53% was used; this estimate is based on the mean percentage coverage for this habitat for NSUH sites at which this habitat was recorded. For each of the point records not intersecting within a polygon that was yielding an area, 10 ha of habitat was estimated.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	The NSUH reports minor losses for this habitat at the sites surveyed. Outside these sites losses in area are likely due to impacts including afforestation, windfarms and grazing.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	NPWS (2007) reported the area of habitat 4010 as unknown.

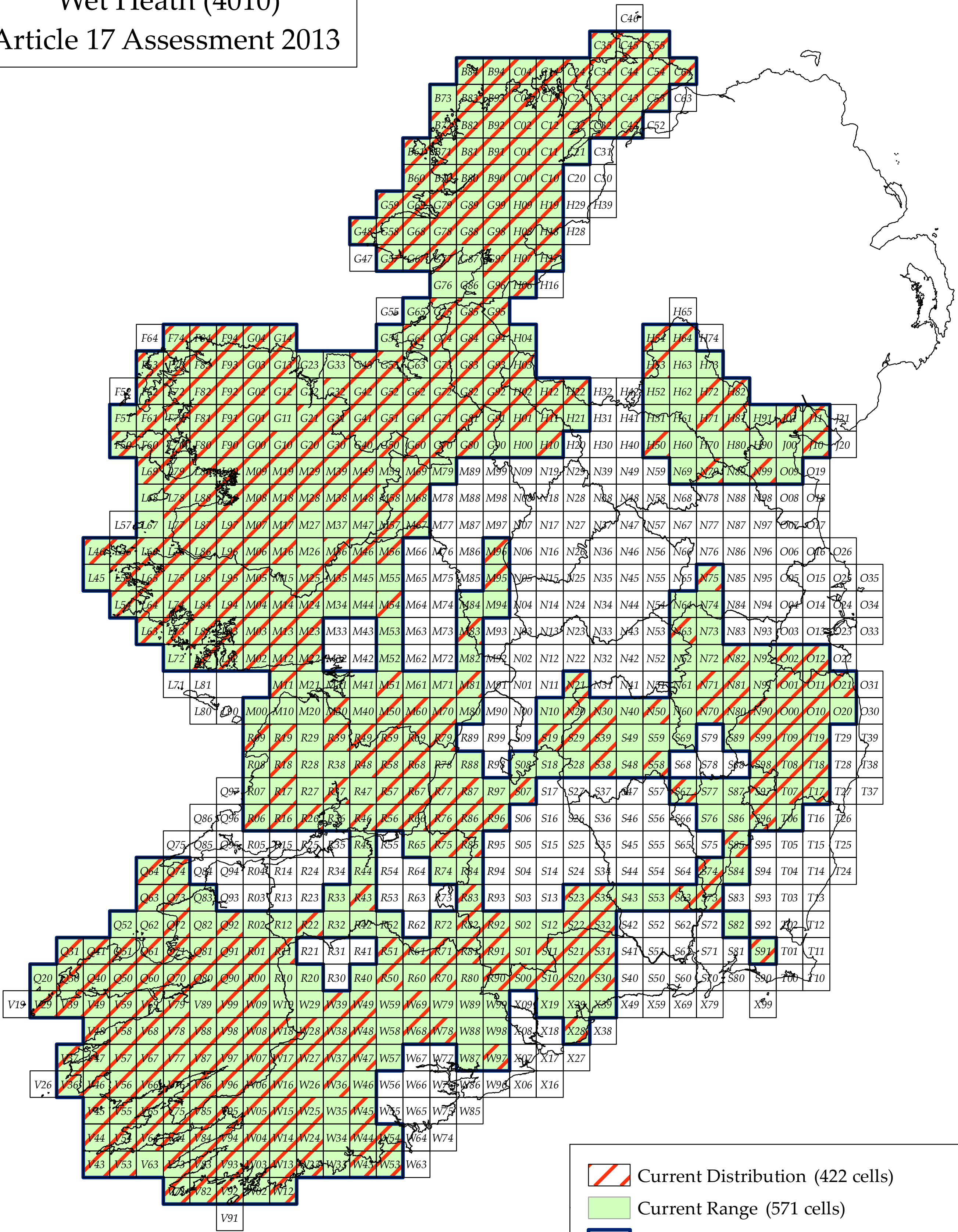
Field label	Note
Habitat code: 4010	
2.5 Main pressures	Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing or trampling are high, is problematic within this habitat. Small amounts of afforestation with non-native conifers have been recorded within cSACs by the NSUH but this impact is likely to be much more prevalent outside of designated areas. The mining and quarrying impacts recorded within this habitat include sand and gravel extraction. A review of Irish wind farm developments has indicated that 7% of wind farms have impacted this habitat. This review located wind farms using grid references provided by the Sustainable Energy Authority of Ireland, with locations for recent wind farms being added from the IWEA website. Aerial photograph interpretation was then used to identify the habitats in the vicinity of these co-ordinates. Campylopus introflexus is the most frequent invasive non-native species within this habitat but, unless it forms extensive carpets which can suppress heather re-establishment, it is considered a mild or temporary invasive as it does not have long-terms effects on biodiversity. The more pernicious invasive non-native species Rhododendron ponticum is becoming established at a small number of sites. Burning was recorded within this habitat at 50% of the sites surveyed by the NSUH. “Water abstractions from groundwater” and “Damage by herbivores (including game species)” refer to the digging of drainage ditches and deer grazing, respectively. Where levels of grazing or trampling by sheep are excessive, this habitat is prone to erosion. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general, western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact. Additional pressures which do not fit on the form: D02…Utility and service lines…Low E01.03…Dispersed habitation…Low E02…Industrial or commercial areas…Low G05.07…Fences, fencing…Low H05.01…Garbage and solid waste…Low
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. Information relevant to this habitat was also utilised where possible from the NPWS Site Inspection Report database; some of the impacts recorded in this database were not specific enough. Additional pressures, particularly those which are more relevant outside the SAC network, have been added through expert judgement.

Field label	Note
Habitat code: 4010	
2.6 Main threats	The list of threats is the same as the list of pressures. Initial indications are that wet heath may not be adversely affected by predicted climate change models in an overall sense, but this will need to be investigated further in an Irish context (Berry et al., 2002; Hampton 2008). Additional pressures which do not fit on the form: D02...Utility and service lines...Low E01.03...Dispersed habitation...Low E02...Industrial or commercial areas...Low G05.07...Fences, fencing...Low H05.01...Garbage and solid waste...Low
2.7 Complementary information	The list of typical species is based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement.
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure. Criteria were adapted from the UK's Common Standards Monitoring using expert judgement (JNCC 2009). The NSUH primarily assesses cSACs and is currently incomplete, but the monitoring stops do cover several important sites for this habitat in Ireland. A total of 166 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. Grazing, lack of positive indicator species, low moss/lichen cover and disturbed ground were the main reasons for failures. 1. Erica tetralix present within 20 m (10.2%) 2. Cover of positive indicator species ≥ 50% (20.5%) 3. Total cover of Cladonia, Sphagnum, Racomitrium lanuginosum and pleurocarpous mosses ≥ 10% (28.3%) 4. Cover of ericoid species and Empetrum nigrum ≥ 15% (36.1%) 5. Cover of dwarf shrub species <75% (3.0%) 6. Cover of negative indicator species <1% (5.4%) 7. Cover of non-native species in relevé <1% (2.4%) 8. Cover of non-native species in relevé <1% (3.6%) 9. Cover of scattered native trees and scrub <20% (0.0%) 10. Cover of Pteridium aquilinum <10% (1.2%) 11. Cover of Juncus effusus <10% (0.0%) 12. Crushed or pulled up Sphagnum <10% of Sphagnum cover <10% (0.7%) 13. Grazing of ericoids, Empetrum nigrum and Myrica gale <33% (12.5%) 14. No signs of burning into moss layer/exposure of peat surface due to burning (6.0%) 15. No signs of burning within sensitive areas (4.9%) 16. Cover of disturbed bare ground in relevé <10% (8.4%) 17. Cover of disturbed bare ground in local vicinity <10% (13.3%) 18. Area showing signs of drainage <10% (9.7%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is less than the FRV for area but not more than 10% below the FRV. The FRV may change following future fieldwork.

Field label	Note
Habitat code: 4010	
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Expert judgement determines ongoing decline due to loss of habitat to afforestation, agricultural improvement, windfarms etc.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 166 monitoring stops recorded in this habitat by the NSUH, 105 stops (63%) failed. As this failure rate is over the 25% threshold hence a U2 – Bad assessment is suggested. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the main impacts on this habitat is grazing, a qualifier of "+improving" is applied due to the Commonage Framework Plans (CFP). Note, however, that the CFP does not provide data specific to habitat 4010 and has had limited monitoring. The NSUH is a baseline survey and so has provides no data on trends. Note also that improvements due to lower grazing levels are likely to be tempered by other ongoing impacts such as unregulated burning. A speculative assessment of U2 - Bad was made for the last reporting period (NPWS 2007).
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Bad prospects, future prospects is assessed as U2 –Bad. A speculative assessment of U2 - Bad was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / FRV / =stable / =FRV / Good Area / <FRV / -declining / <FRV / Poor S&F / <<FRV / +improving / <<FRV / Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one of the three parameters is declining and one is improving, the qualifier is assessed as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U2 – Bad, the overall assessment is U2 – Bad.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U2 – Bad.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Field label	Note
Habitat code: 4010	
3.2 Conservation measures	Approximately half of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation. In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-Nephin SPA (2.1). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere. All applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. This measure is rated as 'no effect' as adaptation of forestry regulations is required to enhance protection of this habitat. Regulated, small-scale heather burning can produce a diverse structure of heather of high conservation value. However, most heather burning is conducted too frequently, in a poorly or uncontrolled fashion over large areas, probably with the aim of promoting grassland for grazing. Burning is probably less appropriate management for wet heath than for dry heath. National guidelines and regulation on appropriate heather burning procedures are required (1.2). In areas of commonage, heather burning should be regulated at a local level. Positive conservation measures in Killarney National Park include culling of deer (7.1).

Wet Heath (4010)
Article 17 Assessment 2013



Current Distribution (422 cells)
Current Range (571 cells)
Favourable Reference Range (571 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 4030

NAME: European dry heaths

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	63200	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	63200
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1094.22		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	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. Whilst this figure is unknown it is deemed to be more than the current area due to declines in the	

intervening period. Losses are unlikely to have been more than 10% of the FRA however.

2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
dispersed habitation (E01.03)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
fences, fencing (G05.09)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	high importance (H)	N/A
Erosion (K01.01)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A

Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	high importance (H)	N/A
Erosion (K01.01)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats modelling (2)

2.7 Complementary Information

2.7.1 Species

Arctostaphylos uva-ursi

Breutelia chrysocoma

Calluna vulgaris

Campanula rotundifolia

Carex flacca

Carex pulicaris

Daboecia cantabrica

Dicranum scoparium

Dryas octopetala

Empetrum nigrum

Erica cinerea

Festuca spp.

Galium saxatile

Galium verum

Hypericum pulchrum

Juniperus communis

Lotus corniculatus

Molinia caerulea

Potentilla erecta

Scleropodium purum

Sesleria caerulea

Succisa pratensis

Thymus polytrichus

Ulex gallii

Vaccinium myrtillus

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Vaccinium vitis-idaeus

2.7.2 Species method used	Through the NSUH typical species were assessed as an assemblage at the monitoring stop level within sites surveyed. At each monitoring stop a minimum of two indicator species were required together with a cover of ≥ 50% for siliceous heaths and 50%-75% for calcareous heaths. During the NLPS a minimum of seven indicator species were required. As both were baseline surveys trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network = 630.74 km2 Area of habitat outside SAC network = 463.48 km2 Area of habitat within SAC network that is QI = 390.57 km2 Area of habitat within SAC network that is not QI = 240.17 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	630.74	max	630.74
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Administrative	medium importance (M)	Both	Enhance
Maintaining grasslands and other open habitats (2.1)	Administrative	high importance (H)	Both	Enhance
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	No effect

Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Regulation/ Management of hunting and taking (7.1)	Administrative	low importance (L)	Inside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 4030	
0.2 Habitat code	Habitat 4030 Dry heath has been defined in an Irish context by Perrin et al. (2013a). Dry heaths comprise vegetation dominated by ericaceous dwarf shrubs and usually occur on well-drained, nutrient-poor and acidic mineral soils or shallow peats on sloping ground (typically less than 50 cm deep). Calluna vulgaris is usually 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 start to merge into 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 also included; these communities tend to contain several species of calcareous grassland. Stands of Ulex europaeus are deemed to be scrub communities and are not included.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat is widespread across the country, particularly in the west, but is absent from significant areas of the midlands and the east.

Habitat code: 4030

Field label	Note
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4030, Fossitt codes HH1 or HH2 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). Blarney Electoral District habitat survey. A Cork County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (O'Donoghue et al. 2008). Burren National Park Habitat Map. An NPWS habitat mapping project. Habitat information is based on a broad habitat map of the wider Burren area, which was prepared in 2006, together with other maps of varying ages. Carlow Pilot Habitat Mapping Project. GIS files for this Carlow County Council habitat survey were available. Carrigaline Electoral District habitat survey. A Cork County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Anon. 2007). Cavan Wetland Survey. GIS files for this Cavan County Council habitat survey were available. Clare Wetland Survey. A Clare County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Crushell and Foss 2008). Commonage Framework Plans (CFP). An NPWS/Department of Agriculture project providing the location of commonage areas and the habitats recorded. A widespread dataset covering over 4,400 km². Anon (1998) is a manual for the preparation of commonage framework plans. In the 2007 report, 78 CFP records of wet heath centred on eastern Galway were excluded. These records were also excluded from the current distribution. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura 2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. Ecological study of two Donegal Islands. A Donegal County Council project based on field surveys. The report for this project (Anon. 2010) was made available. Dún Laoghaire Rathdown habitat survey 2011. GIS files for this Dún Laoghaire Rathdown County Council habitat survey of were made available. Fingal habitat survey. GIS files for this project were made available by Fingal County Council.

Galway City Habitat Inventory. A Galway City County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Anon. 2005).

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 cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs.

Irish Semi-natural Grassland Survey. An NPWS project mapping semi-natural grassland sites and assessing the conservation status of Annex I grassland habitats (Martin et al. 2007, 2008, O'Neill et al. 2009, 2010). Where HH1 or HH2 had been recorded in the ISGS database as an internal habitat the centroid point for the survey site was entered in the point shapefile as an indication of where the habitat occurred.

Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron & Perrin 2011).

Laois Habitat Survey. A Laois Heritage Forum habitat survey (Hickey & Tubridy 2009). Habitat information is based on field surveys.

Limestone Pavement Project. An NPWS pilot project mapping and assessing the conservation status of Annex I habitats associated with limestone pavement. The methodology for this survey is detailed in Murphy & Fernández (2009). Habitat information is based on field surveys. GIS data from the subsequent National Survey of Limestone Pavement and Associated Habitats in Ireland (NSLP, Wilson & Fernández 2013) was not available at the time of compiling this assessment.

Lough Derg Habitat survey. GIS files for this project were made available by Clare County Council.

Louth Wetland Survey. A Louth County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Foss et al. 2012).

Midleton Electoral District habitat survey. A Cork County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (O'Donoghue et al. 2011).

Monaghan Wetland Survey. A Monaghan County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Foss & Crushell 2012).

N18 EIS. GIS files for this project were made available by Galway County Council.

National Juniper Database. An NPWS project recording locations of juniper formations (Cooper et al. (2012). The database included reference to dry heath habitat and the coordinates of these were used.

National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these.

Red Grouse Habitat Survey. An NPWS project assessing the availability of suitable habitat for Red Grouse (Crushell & O'Callaghan 2008). Habitat details for 1 km sample squares were based on field surveys.

Sligo Wetlands Survey. A Sligo County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson 2009).

South Clare Habitat Map Cratloe to Parteen. GIS files for this project were made available by Clare County Council.

Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available.

Wicklow Wetland Survey. A Wicklow County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson and Foss 2011).

Polygons were clipped extensively to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. The boundaries of designated sites which contained the relevant habitat were omitted if more localised datasets (e.g. Commonage Framework Plans and/or Conservation Planning Unit data) had coverage of greater than 50% within the designated site. Boundaries of designated sites were further reviewed to ensure their inclusion would not extend the distribution of the habitat into 10 km grid squares which, following aerial photograph review, were determined not to contain the relevant habitat. Where this occurred designated sites were represented by points rather than polygons. The point shapefile was also used to locate records from the National Juniper Database, Irish Semi-natural Grassland Survey and an Ecological Study of Two Donegal Islands. It also contains points locating pNHA sites for which no habitat polygon shapefiles were available.

The CFP data and Red Grouse Habitat Survey data for the Wicklow Mountains was used in preference to the draft Vegetation and habitat survey of Wicklow Uplands cSAC [O'Donovan G. (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service]. The Corine National Land Cover dataset was not used in the assessment of this habitat. Information compiled in 2000 on the distribution of 4030 [Conaghan J. (2000) The distribution, on a 10km square basis of selected habitats in the Republic of Ireland. Enviroscope Environmental Consultancy, Galway. Report to Dúchas, The Heritage Service] has been superseded by more recent data.

Field label	Note
Habitat code: 4030	
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/ Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing, the latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis and the habitat has been recorded at each of the sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b, 2012a,b, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Berry et al. (2007) is an assessment of the vulnerability of habitats to climate change. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 4030 and include important sites for this habitat such as Carlingford Mountain cSAC, Galtee Mountains cSAC and the Comeragh Mountains cSAC. The NSUH has so far concentrated mainly on the northwest of the country. The reliability of some data sources may be questioned due to the differences in criteria used to identify the habitat and to differentiate dry heath from wet heath. For example, extensive use was made of data from the CFP which relied heavily on soil depth to determine habitats.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 86,500 km2, which covers the entire country. Different data sources were used to calculate the range this time. In particularly, soil data was not used – in 2007 squares were included solely on the presence of suitable soil type. The loss of a few squares from the range is due to the use of more localised records rather than using just designated site boundaries (e.g. along the Shannon Estuary).
2.3.10 c) Reason for change - use of different method	A significant reason for the change in range is the use of the range tool. In 2007, a very large gap in the distribution in the north midlands was included in the range.

Field label	Note
Habitat code: 4030	
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution and a point shapefile. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat. For polygons from other sources (e.g. CPU) that mapped specific areas of this habitat, habitat percentages were calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 4030 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. For cSACs with no localised polygon records but for which 4030 is a qualifying interest, the habitat percentage from the Natura 2000 Standard Data Form was used. For other designated sites with no localised polygon records a habitat percentage of 15% was used; this estimate is based on the mean percentage coverage for this habitat for NSUH sites at which this habitat was recorded. For each of the point records not intersecting within a polygon that was yielding an area, 10 ha of habitat was estimated.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	The NSUH reports minor losses for this habitat at the sites surveyed. Outside these sites losses in area are likely due to impacts including scrub encroachment and agricultural improvements..
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource. The NSLP was also a baseline survey and did not attempt to assess area for the lowland community.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 6,807 ± 4,857 km2. More accurate knowledge of the area of habitat 4030 is available from the NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	Different GIS layers were used to calculate the area of habitat 4030 in 2007 (NPWS 2007). In particular the inclusion of areas based solely on the presence of suitable soil types, appears to have contributed to a significant overestimation of the national resource.

Field label	Note
Habitat code: 4030	
2.5 Main pressures	Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing are high, is problematic within this habitat. Small amounts of afforestation with non-native conifers have been recorded within SACs by the NSUH but this impact is likely to be much more prevalent outside of designated areas. The mining and quarrying impacts recorded within this habitat by the NSUH include sand and gravel extraction. Active quarries were also recorded as an impact by the NLPS. A review of Irish wind farm developments has suggested that 8% of wind farms have impacted this habitat. This review located wind farms using grid references provided by the Sustainable Energy Authority of Ireland, with locations for recent wind farms being added from the IWEA website. Aerial photograph interpretation was then used to identify the habitats in the vicinity of these co-ordinates. Campylopus introflexus is the most frequent invasive non-native species within this habitat recorded by the NSUH but, unless it forms extensive carpets which can suppress heather re-establishment, it is considered a mild or temporary invasive as it does not have long-term effects on biodiversity. The NLPS also recorded non-native invasive species at two of the four sites surveyed for 4030. Bracken encroachment and succession towards birch woodland occasionally occur. Inappropriate burning within sensitive areas of this habitat was recorded at 50% of the sites surveyed by the NSUH. Whilst burning can be an important tool in heathland management, uncontrolled high-frequency burning can damage the long-term viability of this habitat. Damage by herbivores (including game species) refers to deer grazing. Dumping of household waste occurs within this habitat. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact (C. Douglas pers. comm.). Additional pressures which do not fit on the form: E02...Industrial or commercial areas...Low E04.01...Agricultural structures, buildings in the landscape...Low H05.01...Garbage and solid waste...Low
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. Information relevant to this habitat was also utilised where possible from the NPWS Site Inspection Report database; some of the impacts recorded in this database were not specific enough. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.

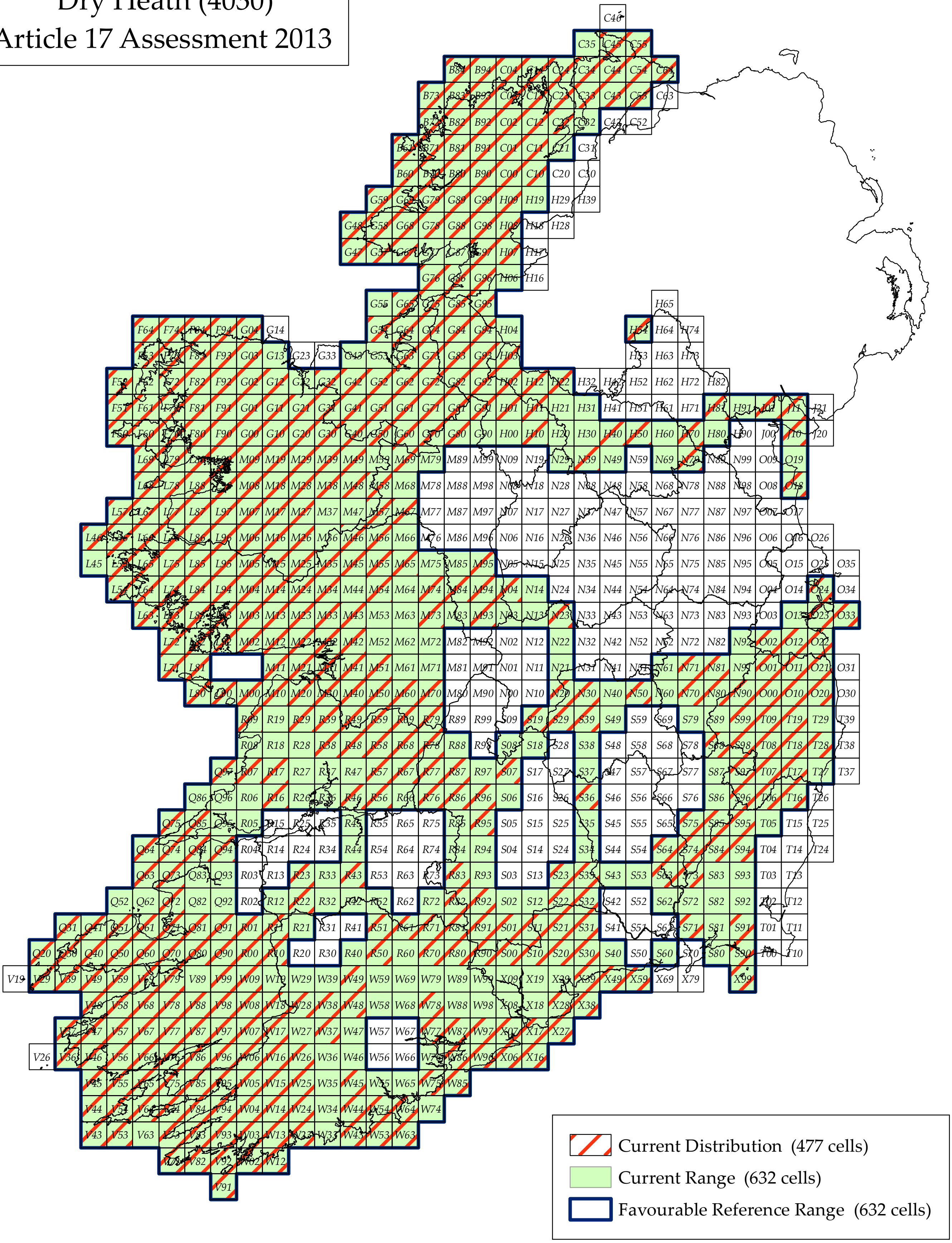
Field label	Note
Habitat code: 4030	
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of two entries related to climate change. This habitat could decline in extent or change significantly in composition because of climate change (Berry et al. 2007). Additional threats which do not fit on the form: E01.03…Dispersed habitation…Low E02…Industrial or commercial areas…Low E04.01…Agricultural structures, buildings in the landscape…Low G05.09…Fences, fencing…Low H05.01…Garbage and solid waste…Low
2.6.01 Method used - Threats	Berry et al. (2007) modelled changes in potential climate space for a range of species chosen to represent lowland heath in the UK.
2.7 Complementary information	The list of typical species combines typical species which have been assessed during the NSUH and the National Limestone Pavement Survey (NLPS). The NSUH list is based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement. The NSLP list is from Wilson & Fernández (2013). The two separate lists are: NSUH list: Arctostaphylos uva-ursi Calluna vulgaris Daboecia cantabrica Empetrum nigrum Erica cinerea Ulex gallii Vaccinium myrtillus Vaccinium vitis-idaea NLPS list: Arctostaphylos uva-ursi Breutelia chrysocoma Calluna vulgaris Campanula rotundifolia Carex flacca Carex pulicaris Dicranum scoparium Dryas octopetala Empetrum nigrum Erica cinerea Festuca spp. Galium saxatile Galium verum Hypericum pulchrum Juniperus communis Lotus corniculatus Molinia caerulea Potentilla erecta Scleropodium purum Sesleria caerulea Succisa pratensis Thymus polytrichus

Field label	Note
Habitat code: 4030	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover several important sites for this habitat in Ireland. A total of 143 monitoring stops were recorded across all sites with just three of these being from calcareous dry heaths. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. The main reasons for failures were lack of variation in Calluna growth phase, grazing and burning. 1. Number of bryophyte or non-crustose lichen species present, ≥3 (4.2%) 2. No. of positive indicator species present ≥2 (4.2%) 3a. Calcareous heaths: cover of positive indicator species 50-75% (66.7%) 3b. Siliceous heaths: heaths: cover of positive indicator species ≥50% (5.0) 4. Proportion of dwarf shrub cover composed of Myrica gale, Salix repens, Ulex gallii collectively <50% (9.8%) 5. Cover of weedy negative indicator species collectively < 1% (4.9%) 6. Cover of non-native species in relevé <1% (7.0%) 7. Cover of non-native species in local vicinity <1% (1.4%) 8. Cover scattered native trees and scrub <20% (0.0%) 9. Cover of Pteridium aquilinum <10% (1.4%) 10. Cover of Juncus effusus <10% (0.0%) 11. Senescent proportion of Calluna vulgaris cover <50% (2.3%) 12. Browsing of ericoids and Empetrum nigrum collectively <33% (20.8%) 13. No signs of burning within sensitive areas in local vicinity (9.0%) 14. All growth phases of Calluna vulgaris throughout local vicinity, with ≥10% of cover in mature phase (20.8%) 15. Cover of disturbed bare ground in relevé <10% (1.4%) 17. Cover of disturbed bare ground in local vicinity <10 % (4.2%) The NLPS assessed structure and functions at a monitoring stop level for calcareous heaths associated with limestone pavement. A total of 55 monitoring stops were recorded from 19 sites. The criteria used and failure rates are presented below. For full details see Wilson & Fernández (2013). 1. No. of positive indicator species present ≥7 (2%) 2. Cover of herbaceous negative indicator species ≤ 10% (2%) 3. Cover of non-native species ≤ 1% (0%) 4. Cover of trees and scrub (excluding Juniperus communis) ≤ 25% (0%) 5. Cover of disturbed bare ground (not including rocks/stones) ≤ 10% (0%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is less than the FRV for area but not more than 10% below the FRV. The FRV may change following future fieldwork.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Expert judgement was used to determine that there is an ongoing decline due to loss of habitat as a result of scrub encroachment and agricultural improvement. However there is the possibility of recovery of many areas due to reduced grazing pressure.

Field label	Note
Habitat code: 4030	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 143 monitoring stops recorded in this habitat by the NSUH, 60 stops (42%) failed. None of the 55 monitoring stops recorded by the NLPS failed. The overall failure rate was 40%, although combining data from both surveys is rather difficult as the sampling of the calcareous heath community which is only a small proportion of the national resource was more intensive than the sampling of the siliceous heath community. This failure rate is over the 25% threshold hence a U2 – Bad assessment was made.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the main impacts on this habitat is grazing, a qualifier of "+improving" is applied due to the Commonage Framework Plans (CFP). Note, however, that the CFP does not provide data specific to habitat 4030 and has had limited monitoring. There is evidence that the Burren Farming for Conservation Programme (Anon. 2013) is starting to have a positive effect in the areas where they have been implemented, particularly in relation to scrub encroachment and the introduction of sustainable grazing regimes. The NSUH is a baseline survey and so has provides no data on trends. Note also that improvements due to lower grazing levels are likely to be tempered by other ongoing impacts such as unregulated burning. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no fieldwork was actually conducted; there is no evidence that status has actually declined since this time.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Bad prospects, future prospects is assessed as U2 – Bad. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007); there is no evidence that status has actually declined since this time. Parameter Actual Status Future trend Future status Prospects Range =FRV =stable =FRV Good Area <FRV -declining <FRV Poor S&F <<FRV +improving <<FRV Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one of the three parameters is declining and one is improving, the qualifier is assessed as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U2 – Bad, the overall assessment is U2 – Bad.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate, but this difference is likely to be due to improved information and different assessment procedures.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Field label	Note
Habitat code: 4030	
3.2 Conservation measures	A substantial proportion of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation. In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-Nephin SPA (2.1). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere. Wilson & Valverde (2013) report on initiatives in improved landuse management by the BurrenLIFE Project and Burren Farming for Conservation Programme (Anon. 2013) that aim to reduce current pressures and future threats, such as inappropriate grazing regimes and scrub encroachment, this will positively impact 4030/4060/6210 in the Burren area. All applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. This measure is rated as 'no effect' as adaptation of forestry regulations is required to enhance protection of this habitat. The Boleybrack Mountain Red Grouse Project in north Leitrim has conducted heather burning in compliance with their approved burn plan (2.1). Regulated, small-scale heather burning can produce a diverse structure of heather of high conservation value. However, most heather burning is conducted too frequently, in a poorly or uncontrolled fashion over large areas, probably with the aim of promoting grassland for grazing. National guidelines and regulation on appropriate heather burning procedures are required (1.2). Where dry heath occurs on commonage, heather burning should be regulated at a local level. Positive conservation measures in Killarney National Park include culling of deer (7.1).

Dry Heath (4030)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 4060	
NAME: Alpine and Boreal heaths	

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	36300	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	36300
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	170.1		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	approximately equal to (≈)	
	unknown	No	
	method	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. Whilst 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.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
wind energy production (C03.03)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Nitrogen input (N)
		Acid input/ acidification (A)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	low importance (L)	N/A
Erosion (K01.01)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
wind energy production (C03.03)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	medium importance (M)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
burning down (J01.01)	low importance (L)	N/A
Erosion (K01.01)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats: modelling (2)

2.7 Complementary Information

2.7.1 Species

Arctostaphylos uva-ursi
Breutelia chryscoma
Calluna vulgaris
Campanula rotundifolia
Carex bigelowii
Carex caryophyllea
Carex flacca
Carex pulicaris
Cetraria islandica
Cladonia arbuscula
Cladonia portentosa
Cladonia rangiferina
Cladonia rangiformis
Cladonia uncialis
Ctenidium molluscum
Dicranum scoparium
Diphasiastrum alpinum
Diplophyllum albicans
Dryas octopetala
Empetrum nigrum
Erica cinerea
Erica tetralix
Festuca spp.
Helianthemum oelandicum
Herbertus aduncus
Hylocomium splendens
Hypericum pulchrum
Juniperus communis
Linum catharticum
Lotus corniculatus
Molinia caerulea
Persicaria vivipara
Polygala vulgaris
Potentilla erecta
Racomitrium lanuginosum
Salix herbacea
Scapania gracilis
Scleropodium purum
Sesleria caerulea

Solidago virgaurea
Succisa pratensis
Thymus polytrichus
Vaccinium myrtillus
Vaccinium vitis-idaea
Viola spp.

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop cover of indicator species needed to be at least 66%. Typical species were also assessed as an assemblage at the monitoring stop level within sites surveyed by the NSLP. At each monitoring stop at least seven positive indicator species (listed in 2.7.1) were required ot be present. As these were both baseline surveys, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network =135.61 km2 Area of habitat outside SAC network = 34.48 km2 Area of habitat within SAC network that is QI = 121.34 km2 Area of habitat within SAC network that is not QI = 14.28 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	improving (+)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	135.61	max	135.61
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Regulation/ Management of hunting and taking (7.1)	Administrative	low importance (L)	Inside	Enhance
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	No effect

Field label	Note
Habitat code: 4060	
0.2 Habitat code	Habitat 4060 Alpine and Boreal heath consists of two distinct communities in Ireland: i) The upland community has been defined by Perrin et al. (2013a) and occurs on the exposed summits and upper slopes of mountains on acidic substrate. It typically occurs from around 350-400 m upwards, but can occur at lower altitudes in more exposed locations. The vegetation is characterised by low-growing, wind-clipped dwarf shrubs, with Calluna vulgaris typically the most frequent, and by the abundance of Racomitrium lanuginosum. The definition of this habitat has been revised since the 2000-2006 reporting period (NPWS 2007) in that whilst the presence of arctic-alpine species indicates high quality examples of this community, it is not deemed a requisite. ii) The lowland community comprises Dryas heath on limestone in the Burren. The vegetation is characterised by mats of Dryas octopetala accompanied by species typical of calcareous grassland.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. The upland community occurs in the west of Galway and Mayo and from Sligo to the far north of Donegal. It also occurs from western Kerry across the southern counties and round to Wicklow. The lowland community occurs in the Burren in northern Clare. The habitat is absent from most of the midlands.

Field label	Note
Habitat code: 4060	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 4060, Fossitt code HH4 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Ballycroy National Park Habitat Map. An NPWS project which compiled habitat data from available information. Datasets used were from 1991-2009. Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). 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. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura 2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. 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 cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron & Perrin 2011). Limestone Pavement Project. An NPWS pilot project mapping and assessing the conservation status of Annex I habitats associated with limestone pavement. The methodology for this survey is detailed in Murphy & Fernández (2009). Habitat information is based on field surveys. GIS data from the subsequent National Survey of Limestone Pavement and Associated Habitats in Ireland (NSLP, Wilson & Fernández 2013) was not available at the time of compiling this assessment. Moran (2009). Points were taken from this Burren relevé dataset when the percentage cover of Dryas octopetala was 10% or greater and the total cover of dwarf shrubs was 25% or greater. NPWS (2007). The previous GIS for reporting on 4060 defined areas over 350 m in altitude. These polygons were added to the polygon shapefile where they did not overlap with any polygon used from the other sources; that is they were added if there was no specific records for that upland area. National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a).

Field label	Note
Habitat code: 4060	
	Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these. Parr et al. (2009). Points were taken from this Burren relevé dataset when the percentage cover of Dryas octopetala was 10% or greater and the total cover of dwarf shrubs was 25% or greater. Red Grouse Habitat Survey. An NPWS project assessing the availability of suitable habitat for Red Grouse (Crushell & O'Callaghan 2008). Habitat details for 1 km sample squares were based on field surveys. Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available. Polygons were clipped to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. Where specific areas of rocky slope had been mapped, these polygons superseded those denoting NHA, pNHA or cSAC site boundaries. O'Donovan G. (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service. This report and associated GIS data were examined but not deemed suitable for use in the distribution map.
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]

Field label	Note
Habitat code: 4060	
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis and the habitat has been recorded at each of the sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b 2012a,b, Perrin et al. 2011, 2012, 2013a,b,c,d,e). NPWS (2007) includes the backing document, GIS and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent Interpretation Manual for Annex I habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Wyse Jackson (2008) is a consideration of the impacts of climate change on plant diversity in Ireland. Hodd (2012) is a PhD thesis on oceanic montane vegetation in Ireland and its potential response to climate change. Zaghi (2008) is a guide to the management of 4060. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 4060 and include important sites for this habitat such Mount Brandon cSAC, Corraun Plateau cSAC and Croaghaun/Slievemore cSAC. The NSUH has so far concentrated mainly on the northwest of the country. For other potentially important areas only partial data exists or there is no information available (these latter areas are included in the range solely on the basis of being over 350 m). The presence of this habitat within several lowland coastal cSACs in the northwest needs checking in light of the refined habitat definition.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 29,500 km2. The loss of a few squares from the range is due to the use of more localised records rather than using just designated site boundaries (e.g. Carlingford Mountain). Habitat 4060 is a Qualifying Interest (QI) for Inis Mor cSAC in the Aran Islands, but on review of the notes accompanying the Natura 2000 Standard Data Form, it was deemed that the habitat does not occur there. Dryas octopetala is conspicuously absent from the Aran Island flora and the description of 4060 Alpine and Boreal heath for Inis Mor cSAC is essentially identical to the description of 4030 Dry heath. Squares covering the Aran Islands have therefore not been included within the range.
2.3.10 c) Reason for change - use of different method	The main reason for the change in the estimated range is the use of the range tool as when the 2007 range was calculated small gaps (2 squares or less) were not included.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.

Field label	Note
Habitat code: 4060	
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile and point shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat. For polygons from other sources (e.g. CPU) that mapped specific areas of this habitat, habitat percentages were calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 4060 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. For cSACs with no localised point or polygon records but for which 4060 is a Qualifying Interest, the habitat percentage from the Natura 2000 Standard Data Form was used. For each of the three Burren cSACs, where the distribution of the habitats was represented by relevé points rather than the site boundary, the area derived from the Natura 2000 Standard Data Form was applied to an arbitrary centroid point. For other designated sites with no localised point or polygon records a habitat percentage of 3.79% was used; this estimate is based on the mean percentage coverage for this habitat for NSUH sites at which this habitat was recorded. For polygons representing areas over 350 m, a value of 5% was used as the habitat percentage; this estimate is intermediate between the mean percentage coverage at a site level (3.79%) and the mean percentage coverage at a polygon level (7.27%) using the NSUH data. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	The NSUH reports no significant losses in area of habitat 4060 in the uplands during the reporting period. There is no information on area change of this habitat in the Burren. In the longer term there may be a slow increase in habitat as it forms as a secondary habitat following high altitude blanket bog erosion. The impact on habitat 4060 of abandonment, scrub encroachment and the decline in traditional farming practices, which are all an issue in the Burren, has not been assessed. In view of the upland community comprising the majority of the habitat the trend is tentatively assessed as stable.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource. The NSLP was also a baseline survey and did not attempt to assess area for the lowland community.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 128 km2. More accurate knowledge of the area of habitat 4060 is available from the NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	For the 2007 report the area was calculated for upland areas from a Digital Terrain Model using polygons defined by criteria of curvature of 65 degrees and elevation above 350 m. For areas in the Burren the percentages on the Natura 2000 Standard Data Form and the areas of the cSACs were used.

Field label	Note
Habitat code: 4060	
2.5 Main pressures	Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing are high, is problematic within this habitat. “Abandonment of pastoral systems, lack of grazing” refers to the Dryas octopetala heath community of the Burren, where grazing pressure has been reduced in recent decades, resulting in encroachment by hazel scrub and bracken, and the replacement of D. octopetala by more competitive grass species. “Walking, horse-riding and non-motorised vehicles” refers to hill walking, which is often concentrated on the ridges and summits where this habitat is found. Campylopus introflexus is the most frequent invasive non-native species within this habitat but, unless it forms extensive carpets which can suppress heather re-establishment, it is considered a mild or temporary invasive as it does not have long-terms effects on biodiversity. Abandonment, scrub encroachment and decline in traditional farming methods are widely viewed to have negative effects on the conservation status of habitats in the Burren, but their effect on habitat 4060 has not been assessed. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact (C. Douglas pers. comm.).
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. Information relevant to this habitat was also utilised where possible from the NPWS Site Inspection Report database; some of the impacts recorded in this database were not specific enough. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of two entries related to climate change. This habitat has been highlighted as particularly sensitive to climate change (Zaghi 2008). Climate change is predicted to impact on the occurrence of arctic-alpine plants in Ireland (Wyse Jackson 2008, Hodd 2012). Some of these are found in high-quality examples of this habitat. As effects from climate change in the next 12 years are likely to be small, the threat is assessed as low, although in the longer term this could be a more significant threat.
2.6.01 Method used - Threats	Hodd (2012) explores the potential impact of climate change on montane flora including arctic-alpine species.

Habitat code: 4060

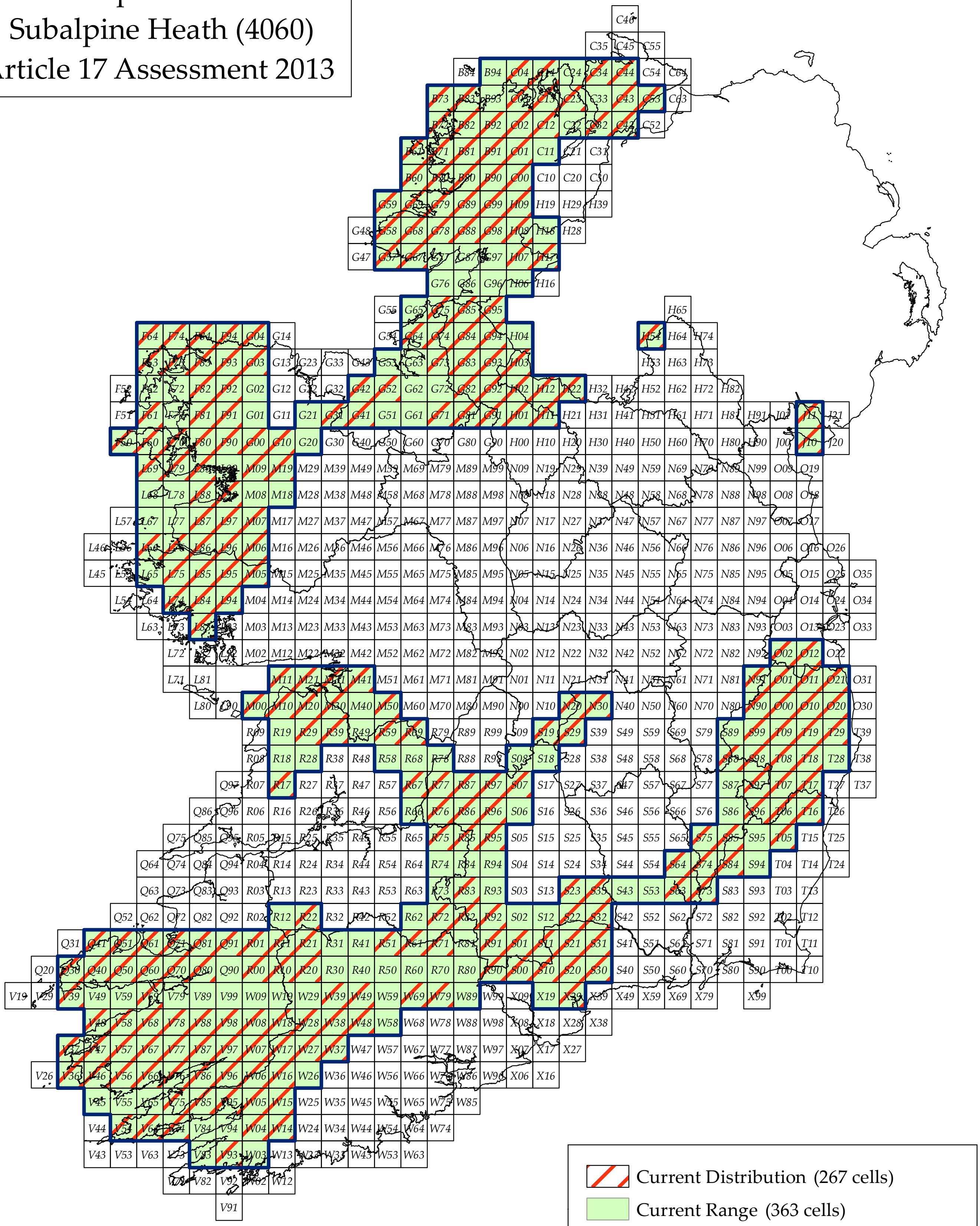
Field label	Note
2.7 Complementary information	The list of typical species combines typical species for the upland and lowland communities. The upland species was based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement. The lowland list was used by the NSLP (Wilson & Fernández 2013). The two separate lists are: Uplands: Arctostaphylos uva-ursi Calluna vulgaris Carex bigelowii Cetraria islandica Cladonia arbuscula Cladonia portentosa Cladonia rangiferina Cladonia uncialis Diphasiastrum alpinum Diplophyllum albicans Dryas octopetala Empetrum nigrum Erica cinerea Erica tetralix Herbertus aduncus Juniperus communis ssp. nana Persicaria vivipara Racomitrium lanuginosum Salix herbacea Scapania gracilis Solidago virgaurea Vaccinium myrtillus Vaccinium vitis-idaea Lowlands: Arctostaphylos uva-ursi Carex flacca Calluna vulgaris Carex caryophyllea Dryas octopetala Carex pulicaris Empetrum nigrum Festuca spp. Erica cinerea Molinia caerulea Helianthemum oelandicum Sesleria caerulea Juniperus communis Thymus polytrichus Breutelia chrysocoma Ctenidium molluscum Campanula rotundifolia Dicranum scoparium Hypericum pulchrum Hylocomium splendens Linum catharticum Scleropodium purum

Field label	Note
Habitat code: 4060	
	Lotus corniculatus Polygala vulgaris Potentilla erecta Cladonia rangiformis Solidago virgaurea Succisa pratensis Viola spp.
2.7.04 Structure and functions - Methods used	For the uplands community, the NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover several important sites for this habitat in Ireland. A total of 76 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. Grazing, lack of positive indicator species and disturbed ground were the main reasons for failures. 1. No. of bryophyte and non-crustose lichen species ≥3 (1.3%) 2. Cover of positive indicator species ≥66% (18.4%) 3. Cover of dwarf shrubs ≥10% (10.0%) 4. Cover of negative indicator species <1% (17.1%) 5. Cover of non-native species <1% (1.3%) 6. Live leaves of selected graminioids showing signs of grazing <10% (11.8%) 7. Grazing of ericoids and Empetrum nigrum <33% (8.1%) 8. No signs of burning inside feature (1.3%) 9. Cover of disturbed bare ground in relevé <10% (5.3%) 10. Cover of disturbed bare ground in vicinity <10% (9.2%) For the lowlands community, the NSLP recorded 19 monitoring stops to assess structure and functions. The criteria used and failure rates are presented below. For full details see Wilson & Fernandez (2013). There were no failures of any criteria. 1. No. of positive indicator species ≥ 7 (0.0%) 2. Cover of negative indicator species ≤10% (0.0%) 3. Cover of non-native species ≤ 1% (0.0%) 4. Cover of trees and shrubs (excluding Juniperus communis) ≤ 25% (0.0%) 5. Cover of disturbed bare ground (rocks/stones not included) <10% (0.0%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is approximately equal to the FRV for area although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 76 monitoring stops recorded by the NSUH in this habitat, 29 stops (38%) failed. None of the 19 stops recorded by the NSLP failed. The overall the failure rate was 31%, although combining data from both surveys is rather difficult as the sampling of the lowland community which is only a small proportion of the national resource was more intensive than the sampling of the upland community. This failure rate is over the 25% threshold and hence a U2 – Bad assessment was made.

Field label	Note
Habitat code: 4060	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As the main impacts on this habitat are due to grazing, a qualifier of "-improving" is applied due to the Commonage Framework Plans (CFP). Note, however, that the CFP does not provide data specific to habitat 4060 and has had limited monitoring. There is evidence that the Burren Farming for Conservation Programme (Anon. 2013) is starting to have a positive effect in the areas where they have been implemented, particularly in relation to scrub encroachment and the introduction of sustainable grazing regimes. The NSUH is a baseline survey and so has provides no data on trends. It may be speculated that recovery in habitat 4060 may very slow due it exposed nature and shorter growing season. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no fieldwork was actually conducted; there is no evidence that status has actually declined since this time.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Bad prospects, future prospects is assessed as U2 –Bad. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007); there is no evidence that status has actually declined since this time. Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / =FRV / =stable / =FRV / Good S&F / <<FRV / =stable / <<FRV / Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one of the qualifiers is improving and none are declining, the qualifier is assessed as improving.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U2 – Bad, the overall assessment is U2 – Bad.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate, but this difference is likely to be due to improved information and different assessment procedures.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Field label	Note
Habitat code: 4060	
3.2 Conservation measures	The majority of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation. In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-Nephin SPA (2.1). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere. Wilson & Valverde (2013) report on initiatives in improved landuse management by the BurrenLIFE Project and Burren Farming for Conservation Programme (Anon. 2013) that aim to reduce current pressures and future threats, such as inappropriate grazing regimes and scrub encroachment, this will positively impact 4060 in the Burren area. All applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. This measure is rated as ‘no effect’ as adaptation of forestry regulations is required to enhance protection of this habitat. Culling of deer (7.1) are positive conservation measures in Killarney National Park. The Burren Farming for Conservation Programme financially supports traditional farming practices that could enhance the status of Dryas heaths (2.1).

Alpine and Subalpine Heath (4060) Article 17 Assessment 2013



Current Distribution (267 cells)

Current Range (363 cells)

Favourable Reference Range (363 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 5130

NAME: Juniperus communis formations on heaths or calcareous grasslands

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2008-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	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. Vol. 1 - Main Report. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	5100	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	5100
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range as there is no evidence of decline since the Directive came into force. The distribution of Juniper formations is scattered across the distribution of Juniper species records, indicating that all geographical variation has been accounted for. There is also no reason to assume that the area is not large enough to allow the long term survival of the habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	46.89		
2.4.2 Year or period	2008-2011		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		

2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	46.89
	operator	N/A
	unknown	No
	method	There was no evidence of decline of the extent of a limited number of formations that had historical data following the 2008-2012 field survey (Cooper et al., 2012) there fore the Favourable reference area has been set as the current area.

2.4.13 Reason for change: Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive mowing or intensification (A03.01)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	low importance (L)	N/A
intensive sheep grazing (A04.01.02)	high importance (H)	N/A
intensive mixed animal grazing (A04.01.05)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	medium importance (M)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
non intensive mixed animal grazing (A04.02.05)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
dispersed habitation (E01.03)	medium importance (M)	N/A
factory (E02.01)	low importance (L)	N/A
Trampling, overuse (G05.01)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	high importance (H)	N/A
burning down (J01.01)	low importance (L)	N/A
Erosion (K01.01)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
competition (flora) (K04.01)	low importance (L)	N/A
damage by herbivores (including game species) (K04.05)	high importance (H)	N/A
flooding and rising precipitations (M01.03)	low importance (L)	N/A

2.5.1 Method used – pressures: based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
intensive mowing or intensification (A03.01)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	low importance (L)	N/A
intensive sheep grazing (A04.01.02)	high importance (H)	N/A
intensive mixed animal grazing (A04.01.05)	medium importance (M)	N/A
non intensive cattle grazing (A04.02.01)	medium importance (M)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
non intensive mixed animal grazing (A04.02.05)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
dispersed habitation (E01.03)	medium importance (M)	N/A
factory (E02.01)	low importance (L)	N/A
Trampling, overuse (G05.01)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	high importance (H)	N/A
burning down (J01.01)	low importance (L)	N/A
Erosion (K01.01)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
competition (flora) (K04.01)	low importance (L)	N/A
damage by herbivores (including game species) (K04.05)	high importance (H)	N/A
flooding and rising precipitations (M01.03)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Carex flacca
Succisa prantensis
Carex nigra
Dryas octopetala
Pedicularis palustris
Cynosurus cristatus
Dactylorhiza maculata
Juncus articulatus
Anagalis tenella
Schoenus nigricans
Prunella vulgaris
Carex viridula
Agrostis stolonifera
Teucrium scorodonia
Geranium sanguineum

Mycelis muralis
Geranium robertianum
Lotus corniculatus
Trifolium pratensis
Viola riviniana
Fraxinus excelsior
Polygala vulgaris
Calluna vulgaris
Erica cinerea
Potentilla erecta
Anthoxanthum odoratum
Carex panicea
Molinia caerulea
Carex binervis
Erica tetralix
Danthonia decumbens
Polygala serpyllifolia
Empetrum nigrum
Luzula multiflora
Nardus stricta
Agrostis canina
Narthecium ossifragum
Eriophorum angustifolium
Galium verum
Pilosella officinarum
Thymus polytrichus
Ammophila arenaria
Daucus carota
Anthyllis vulneraria
Koeleria macrantha
Campanula rotundifolia
Festuca rubra
Plantago lanceolata
Senecio jacobea
Arrhenatherum elatius
Hypochaeris radicata
Linum catharticum
Holcus lanatus
Ranunculus bulbosus
Briza media

Trifolium repens

Dactylis glomerata

Carex arenaria

Hypericum perforatum

Jasione montana

Anacamptis pyramidalis

Plantago coronopus

Juniper communis

2.7.2 Species method used	A suite of releves were recorded in each juniper formation. These data were analysed using Hierarchical Cluster Analysis and Indicator Species Analysis (see Cooper et al., (2012) for further detail). The species listed above were assigned to 5 habitat types: Wet grassland/heath & bog, exposed calcareous rock, dry calcareous heath & grassland, dry siliceous heath & raised bog, dry calcareous/neutral grassland including coastal dunes. Bryophytes were not recorded. For each formation a target number of typical species was required (specific to each "habitat" type) for the indicator to pass.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	33.77 km2 of Juniper formations are within the SAC network where they are selected as a qualifying interest.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Favourable (FV) qualifiers N/A
2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min 34.83 max 34.83
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)
3.1.3. Trend of surface area	stable (0)

3.2 Conservation Measures

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)		()		
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Long term

Article 17 - HABITAT NOTES

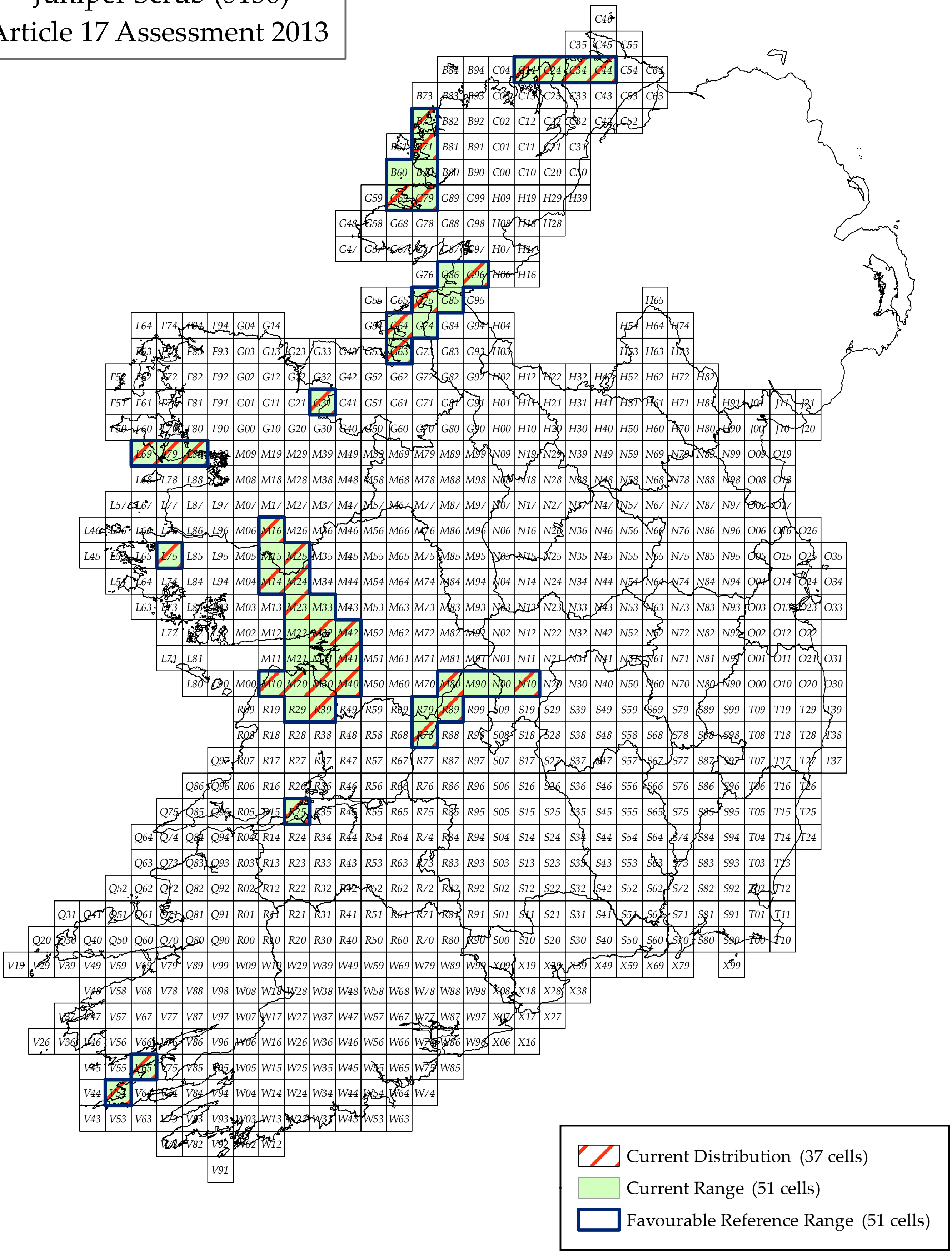
Field label	Note
Habitat code: 5130	
0.1 Member State	Ireland
0.2 Habitat code	A Juniper formation has been defined as a discrete area supporting ≥50 individual shrubs (Cooper et al., 2012). 50 shrubs is taken as the minimum threshold below which isolated groups are unlikely to reproduce in any sufficient numbers to bring about recovery without inbreeding depression being a significant risk. 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.
1.1.02 Method used - map	In Cooper et al. (2012)a total of 837 juniper records, with grid references, were collated. These records referred to the occurrence of the species but with no indication of the number of plants present. Duplicates, including those sharing the same site name but having slightly different spatial references or vice versa were collapsed into a single site. A total of 178 sites were identified for survey. 129 sites supported Juniper of which 4 were inaccessible and therefore not surveyed. However, only 51 of the surveyed locations qualified as Juniper formations. Many Juniper records were discarded as they were too coarse to search for in the field but local knowledge suggests that most formations have been identified. An additional site was confirmed by NPWS subsequent to this survey.
1.1.03 Year or period	2008-2012; all records were validated in the field during these dates.
1.1.04 Additional distribution map	Juniper formation polygons submitted as part of Cooper et al. (2012) were intersected with the ING 10 km square grid.
1.1.05 Range map	A range map was derived following standardised NPWS methods.
2.2 Published sources	Cooper et al. (2012) completed a detailed field survey on 51 formations. Data were collected on, inter alia, Juniper number, extent of population, associated vegetation and pressures. Indicators were derived to assess structure & functions and future prospects at each population. The NPWS Site Inspection Reporting database harbours data on activities impacting habitats and species in SACs, SPAs and NHAs. These data were reviewed to determine whether any significant impacts had been recorded for Juniper.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	The explanation for this field is covered in sections 1.1.2 & 1.1.4
2.3.04 Short term trend - Trend direction	A national baseline survey of this habitat was completed in 2008-2012 (Cooper et al., 2012). Limited earlier data on larger formations from NPWS site files suggest that there have been no losses across the distribution of these formations in the recent past. Accordingly the short term trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 2008-2012 field survey (Cooper et al., 2012) is considered to be the Juniper formation baseline. As there is no evidence of a decline since the Directive came into force and there is no reason to assume that the area is not large enough to allow the long term survival of the habitat, the current range is set as the FRR.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the FRR.

Field label	Note
Habitat code: 5130	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	All Juniper records were used to derive the distribution and range in 2007. Following an extensive field survey in 2008-2011 (Cooper et al., 2012) many of these records did not qualify as juniper formations, therefore the actual range for this habitat is more restricted than depicted in 2007.
2.4.01 Surface area	A minimum convex polygon was derived to encompass juniper records at each field location (Cooper et al., 2012). These values were summed to give a national figure which amounts to 46.89 ha. It was estimated that there is another 18 ha of unsurveyed formations.
2.4.02 Year or period	The area for all known Juniper formations was estimated from a field survey that took place between 2008-2011 (Cooper et al., 2012). An additional site was subsequently identified and added to the total.
2.4.05 Short-term trend - Trend direction	A national baseline survey of this habitat was completed in 2008-2012 (Cooper et al., 2012). Limited data on larger formations from NPWS site files suggest that there have been no losses in the extent of these formations in the recent past. Therefore the short term trend for area is considered to be stable.
2.4.07 Short-term trend - Method used	The trend estimate is based on expert opinion with no or minimal sampling as explained in 2.4.5.
2.4.12 a) Favourable reference area - In km2	The area figure is considered to represent the Juniper formation baseline. As there is no evidence of any significant decline in extent since the Directive came into force the current area is set as the FRA.
2.4.12 b) Favourable reference area - Indicate if operators were used	No symbol is utilised as the current area is considered to equal the FRA.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	An average stand size for all Juniper records was estimated and used to derive the area value in 2007. Following extensive field survey 2008-2011 (Cooper et al., 2012) many of these records did not qualify as juniper formations; the extent of all legitimate juniper formations was estimated by drawing a minimum convex polygon around the juniper shrubs at each formation.
2.5 Main pressures	Pressures were recorded at each formation as minor moderate or severe. The extent of each pressure was estimated as the proportion of the entire formation impacted. 28 pressures were recorded as part of the survey. Pressures with over 10% occurrence across formations were rated as having a High impact, 4-10% as Medium impact and <4% Low impact. The 2007-2009 Site Inspection Reporting cycle only reported one impact at one site and therefore this was not incorporated into the ranked pressures.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats.

Field label	Note
Habitat code: 5130	
2.7.04 Structure and functions - Methods used	A suite of 7 indicators and associated targets were derived following analysis of field data collected from juniper formations (including Juniper regeneration and health; vegetation structure and composition) (Cooper et al. 2012). At each formation 5-7 indicators had to pass for a Favourable assessment; 3-4 for an Unfavourable inadequate assessment and <3 for an Unfavourable bad assessment. There was a certain degree of flexibility with the number of targets that were permitted to fail, due to the possibility that a) Juniper may have boom regeneration years resulting in a population 'bulge' and b) uncertainty as to how the quality of the vegetation composition impacts on the presence of Juniper. The number of formations assessed as Favourable, Unfavourable inadequate or Unfavourable bad was estimated. 28% of formations were assessed as Favourable, 63% as Unfavourable inadequate and only 9% as Unfavourable bad. Therefore the overall assessment of Structure & Functions is Unfavourable inadequate.
2.7.05 Other relevant information	34.83 km2 of Juniper formation occurs within the SAC network. However, many of these formations straddle the SAC boundary and the additional area of contiguous formation is 11.57 km2. 27 SACs contain Juniper formations. However, the habitat listed as a qualifying feature in only 22 SACs and therefore they may not be afforded protection in all sites. There are 7 SACs listed for this habitat where Juniper formations are not present. This may be due to the fact that Juniper is present within the site but it does not qualify as a formation.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for Juniper formations is concentrated in the mid-western and north-western parts of the country with an outlying area in the south-west. There is no evidence of a decline in range since the Directive came into force. Juniper formations are scattered across the distribution of Juniper records in Ireland and therefore all geographical variation is considered to be represented. For these reasons range is assessed as Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The extent of each of the 51 Juniper formation ranges from <0.05 ha to > 2600 ha. Areas within the Burren may be amalgamated into bigger areas in the future as the definition of "discrete" area is very vague and may be amended. There is no evidence of a decline in area since the Directive came into force. For these reasons range is assessed as Favourable.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Juniper formations were assessed as Unfavourable inadequate in 2007. This assessment was based on data from UK populations that highlighted issues relating to seed viability, recruitment and regeneration of Juniper. The 2008-2011 field survey (Cooper et al. 2012) also demonstrated issues relating to recruitment, regeneration and inappropriate grazing regimes. There is no evidence to suggest that the quality of the formations has changed in the recent past. Future monitoring may reveal an ageing Juniper population that may not be able to sustain itself. However, there may be factors impacting on the populations that we do not fully understand, for example, Juniper may have boom recruitment years. The qualifier for structure & function is assessed as stable but this may change following future monitoring rounds where a greater level of understanding will be achieved.

Field label	Note
Habitat code: 5130	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The main issue in relation to the quality of Juniper formation is low recruitment (Cooper et al., 2012). Inappropriate grazing is highlighted as the main pressure. There was a significant negative impact of intensive grazing on recruitment at over 30% of formations. However, problematic native species were also listed as having a high negative impact and these are likely to expand if grazing pressure is reduced: a delicate balance has to be achieved to maximise recruitment. Future Prospects has been assessed as Unfavourable inadequate but this may change following future monitoring rounds and a better understanding of the effect of perceived pressures.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	There are no plans to change the grazing regime at any of these sites or to tackle "problematic" species. The situation could therefore deteriorate if the grazing regime changes and problematic species increase in abundance. However, it is assumed that the situation will remain unchanged and therefore the future prospects qualifier is assigned as stable.
2.8.05 Overall assessment of Conservation Status	The detailed national survey by Cooper et al. (2012) provided new figures for Range and Area. As there is no evidence of decline, Range and Area were assessed as Favourable. Ecological data were analysed to assess the structure & functions and future prospects. Low recruitment and inappropriate grazing were highlighted as the main issues and resulted in an assessment of Unfavourable inadequate for these attributes. The overall assessment has been assessed as Unfavourable inadequate (stable) as there is no evidence of any recent decline in condition and no change is foreseen in the immediate future. Further research is required to attain a greater understanding of the effect of perceived pressures and the conservation measure required to achieve favourable conservation status.
2.8.06 Overall trend in Conservation Status	There is no evidence of a decline in condition and no change is foreseen in the immediate future. Therefore the Overall assessment trend is considered to be stable.
3.1.01 a) Surface area - Minimum	This is the area of formations within the SAC network, i.e. contiguous areas that straddle the SAC boundary have been clipped out even if they form part of the formation.
3.1.01 b) Surface area - Maximum	This area includes the contiguous areas of formations that extend beyond the SAC boundary. A subset of the area may not qualify as a formation.
3.1.03 Trend of surface area within the network	Most of the Juniper formation resource is within the SAC netork. There does not seem to be any apparent difference in the results inside or outside the network. Therefore the same trend is used for the area 2.4.5.
3.2 Conservation measures	Juniper formations that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Juniper formation is regulated under the Environment Liability Regulations 2008. No measures have been undertaken to address the delicate balance of grazing versus expansion of "problematic" species. Further research needs to be carried out before prescriptive measures can be implemented.

Juniper Scrub (5130)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
30-04-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6130
NAME: Calaminarian grasslands of the Violetalia calaminariae

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2008-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Holyoak, D. T. (2008). Bryophytes and metallophyte vegetation on metalliferous mine-waste in Ireland: National Parks and Wildlife Service Unpublished Report. http://www.npws.ie/publications/archive/Holyoak_2008_Metalliferous_mine_survey.pdf

Holyoak, D.T. and Lockhart, N. (2009) Notes on some rare and newly recorded bryophytes of metalliferous mine sites in Ireland. Journal of Bryology 31: 267–282.

Holyoak, D.T. and 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.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	2000	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	2000
	operator	N/A
	unknown	No
	method	The distribution and consequential range value derived from 2008 field survey (Holyoak 2008) is considered to be the Calaminarian Grassland baseline. This is greater than that recorded in the 2007 report, although the increase is due to improved knowledge of the habitat. The favourable reference range is now set at the current range as there is no evidence of a decline in range since the Directive came into force. As this is an artificial habitat in Ireland the ecological extent of variation is not considered.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	0.1358
2.4.2 Year or period	2008-2008
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.4 Short-term trend period	2001-2012
2.4.5 Short-term trend direction	decrease (-)
2.4.6 Short-term trend magnitude	min / max / confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.8 Long-term trend period	
2.4.9 Long-term trend direction	N/A
2.4.10 Long-term trend magnitude	min / max / confidence interval
2.4.11 Long term trend method used	N/A

2.4.12 Favourable reference area	area (km)	0.14
	operator	N/A
	unknown	No
	method	A total area of 13.58 ha was estimated from field survey (Holyoak, 2008). The Favourable Reference Area is set at 14 ha to account for any minor losses since the Directive came into force.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
disposal of household / recreational facility waste (E03.01)	high importance (H)	N/A
competition (flora) (K04.01)	high importance (H)	N/A
Trampling, overuse (G05.01)	high importance (H)	N/A
motorised vehicles (G01.03)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
disposal of inert materials (E03.03)	medium importance (M)	N/A
Interspecific floral relations (K04)	medium importance (M)	N/A
grazing (A04)	low importance (L)	N/A
Storage of materials (E05)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
disposal of household / recreational facility waste (E03.01)	high importance (H)	N/A
competition (flora) (K04.01)	high importance (H)	N/A
Trampling, overuse (G05.01)	high importance (H)	N/A
motorised vehicles (G01.03)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Erosion (K01.01)	medium importance (M)	N/A
disposal of inert materials (E03.03)	medium importance (M)	N/A

Interspecific floral relations (K04)	medium importance (M)	N/A
grazing (A04)	low importance (L)	N/A
Storage of materials (E05)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Cephaloziella massalongi

Cephaloziella nicholsonii

Cephaloziella integerrima

Ditrichum cornubicum

Ditrichum plumbicola

Scopelophila cataractae

Pohlia andalusica

Silene uniflora

Armeria maritima

Minuartia verna

2.7.2 Species method used	Specialised plants and vegetation communities that are tolerant to high levels of toxic metals, principally Copper (Cu), Lead (Pb) or Zinc (Zn), are indicative of Calaminarian Grassland. Some stands of such vegetation in Ireland are notable for the presence of rare bryophytes such as Cephaloziella integerrima, C. massalongi, C. nicholsonii, Ditrichum cornubicum, D. plumbicola, Scopelophila cataractae and Pohlia andalusica, amongst others, as well as inland stands of the vascular plants Silene uniflora and lowland Armeria maritima, and some stands of Minuartia verna.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	8 of the 28 surveyed sites are within 5 SACs (3 of which are selected for Calaminarian Grassland as a qualifying feature). These 8 sites include the two largest stands of the habitat in the county (Glendassan and Allihies) and together constitute 57% (7.8.ha) of the national resource.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Inadequate (U1) qualifiers declining (-)

2.8.3 Specific structures and functions (incl Species)	assessment Favourable (FV) qualifiers N/A
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers improving (+)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min 0.07794 max 0.07794
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)
3.1.3. Trend of surface area	decrease (-)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 6130	
0.2 Habitat code	Mine workings and their artificial spoil heaps can support specialised plants and vegetation communities that are tolerant to high levels of toxic metals, principally Copper (Cu), Lead (Pb) or Zinc (Zn). Some stands of such vegetation in Ireland are notable for the presence of rare bryophytes such as Cephaloziella integerrima, C. massalongi, C. nicholsonii, Ditrichum cornubicum, Scopelophila cataractae and Pohlia andalusica, amongst others, as well as inland stands of the vascular plants Silene uniflora and lowland Armeria maritima, and some stands of Minuartia verna. Vegetation of mine waste with rare bryophytes is ascribable to the habitat 'Calaminarian grasslands of the Violetalia calaminariae'. Community development on new toxic sludge is not considered to represent the EU habitat.
1.1.02 Method used - map	Holyoak (2008) undertook a field survey of 40 sites sub-sampled from the Geological Survey of Ireland database of 'Mine Site Workings' lists, and from other published sources (Doyle, 1982, Lötschert, 1982). An NPWS internal review of the data collected identified and assessed 28 Calaminarian Grassland sites.
1.1.03 Year or period	2008-2012; 28 Calaminarian Grassland sites were surveyed by Holyoak (2008).
1.1.04 Additional distribution map	All 28 Calaminarian Grassland sites recorded from the 2008 survey were intersected with the ING 10km square grid.
1.1.05 Range map	The range map consists of 20 current range cells, including the 17 current distribution cells and a further 3 cells derived from the range tool that could potentially support the habitat due to geological and edaphic reasons.

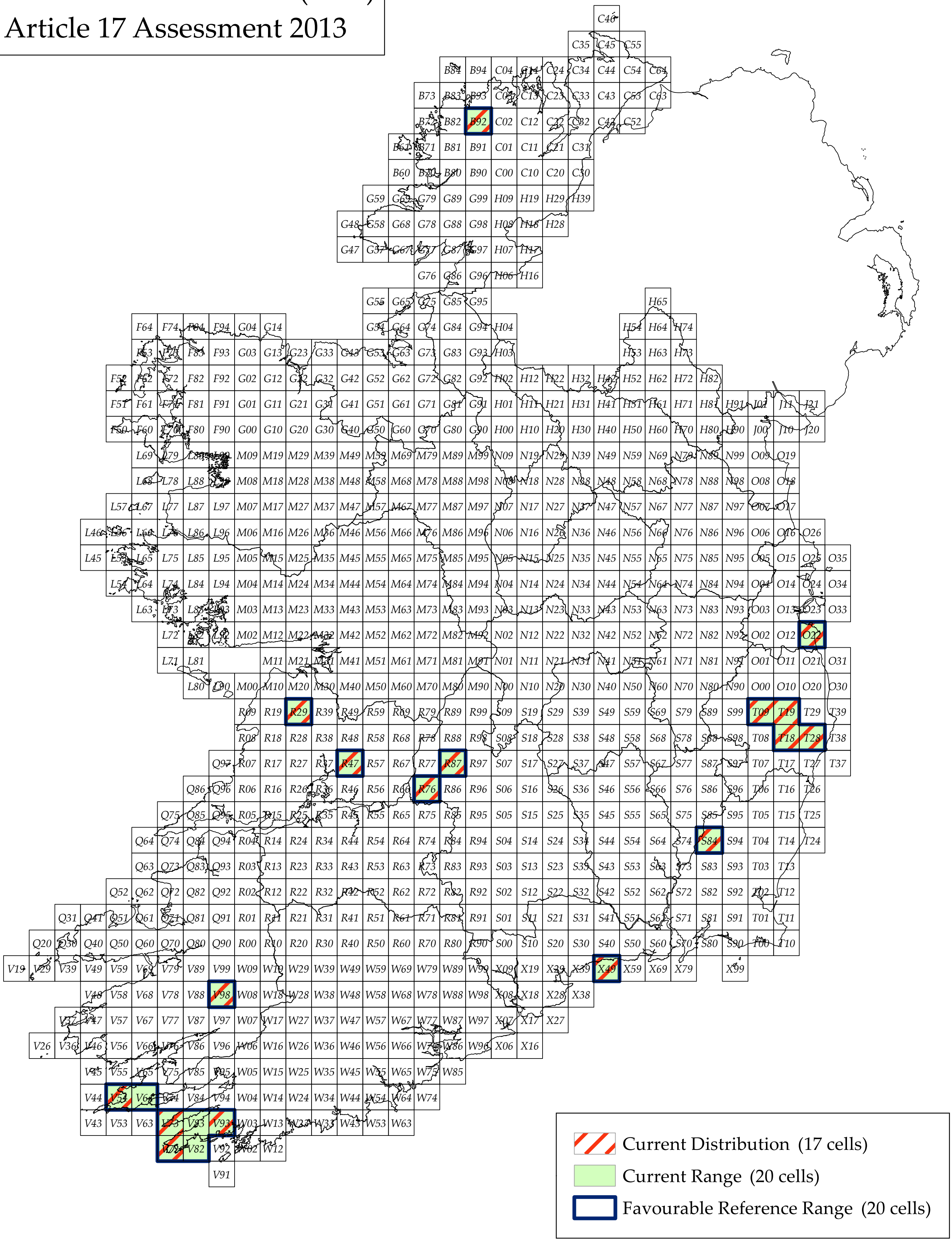
Field label	Note
Habitat code: 6130	
2.2 Published sources	Holyoak (2008) completed a detailed field survey on 40 sites sub-sampled from the Geological Survey of Ireland database of 'Mine Site Workings' lists. Data were collected on, inter alia, presence of Calaminarian Grassland, extent of habitat, associated vegetation, occurrence of metallophyte bryophyte species and pressures. Expert judgement was used to assess structure & functions and future prospects at each population, based on the information from the survey. Useful publications include:- Doyle, J. (1982). Minuartio-Thaspietum alpestris (Violetea calaminariae) in Ireland, Journal of Life Sciences, Royal Dublin Society 3:143–146. Fox, H. (1999). Lichens of three mine sites in Co. Wicklow, Ireland. Biology and Environment, Proceedings of the Royal Irish Academy, Vol. 99B (1):67–71. Giavarini, V. (2011a). Lichen Ireland Surveys of Selected Sites for cRDB Species: Allihies Copper Mines. Unpublished Report for Lichen Ireland and National Parks and Wildlife Service, Dublin. Giavarini, V. (2011b). Lichen Ireland Surveys of Selected Sites for cRDB Species: Wicklow Mountains. Unpublished Report for Lichen Ireland and National Parks and Wildlife Service, Dublin. Holyoak, D. T. (2008). Bryophytes and metallophyte vegetation on metalliferous mine-waste in Ireland: National Parks and Wildlife Service Unpublished Report. http://www.npws.ie/publications/archive/Holyoak_2008_Metalliferous_mine_survey.pdf Holyoak, D.T., Clements, R., Coleman, M.R.J. and MacPherson, K.S. (2000) Appendix 2. Notes on the status and ecology of Ditrichum cornubicum. English Nature Research Reports No. 328: 40–50 Holyoak, D.T. and Lockhart, N. (2009) Notes on some rare and newly recorded bryophytes of metalliferous mine sites in Ireland. Journal of Bryology 31: 267–282. Holyoak, D.T. and 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. and Holyoak, D. (2012). Rare and Threatened Bryophytes of Ireland. National Museums Northern Ireland, Belfast. Lötschert, W. (1982). The heavy metal content of some Irish plants. Journal of Life Sciences, Royal Dublin Society 3:261–266. Purvis, O.W. and Halls, C. (1996). A review of lichens in metal-enriched environments. Lichenologist, 28 (6):571–601.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	The explanation for this field is covered in sections 1.1.2 & 1.1.4

Field label	Note
Habitat code: 6130	
2.3.04 Short term trend - Trend direction	A national baseline survey of this habitat was completed in 2008 (Holyoak, 2008, Holyoak and Lockhart, 2011). Limited data on the habitat from NPWS site files suggest that there have been no losses across the distribution of the habitat in the recent past and accordingly the short term trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 2008 field survey (Holyoak, 2008) is considered to be the Calaminarian Grassland baseline. As there is no evidence of a decline since the Directive came into force and there is no reason to assume that the area is not large enough to allow the long term survival of the habitat, the current range is set as the FRR.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the FRR.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	All known sites of Calaminarian Grassland, based on the occurrence of indicator species referred to in section 0.2, were used to derive the distribution and range in 2007. Following extensive field survey in 2008 (Holyoak, 2008), additional sites have been discovered.
2.3.10 c) Reason for change - use of different method	The standardised range tool was used to derive the range. Expert judgement was used to remove two squares that were thought not to contain the habitat.
2.4.01 Surface area	A total area of 13.58 ha was estimated from the field survey (Holyoak, 2008).
2.4.02 Year or period	The area for all known stands of Calaminarian Grassland was estimated from a field survey that took place in 2008 (Holyoak 2008).
2.4.03 Method used - Area covered by habitat	see 2.4.1.
2.4.05 Short-term trend - Trend direction	A national baseline survey of this habitat was completed in 2008 (Holyoak, 2008). Evidence of a slight recent decline in area was noted at 7 sites. However there is no available data to quantify this decline, thought to be very small and patchy.
2.4.07 Short-term trend - Method used	This heading should read "Method used - short term trend" . The trend estimate is based on a national baseline survey of this habitat (Holyoak, 2008) as explained in 2.4.5.
2.4.12 a) Favourable reference area - In km2	The area figure of 13.58 ha, derived from the 2008 field survey (Holyoak, 2008), is considered to represent the Calaminarian Grassland baseline. The Favourable Reference Area is set at 14 ha to account for any minor losses since the Directive came into force.
2.4.13 a) Reason for change - genuine change?	see section 2.4.5.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The explanation for this field is covered in section 2.3.10.
2.5 Main pressures	Pressures were recorded at Calaminarian Grassland sites surveyed in 2008. Many of the pressures relate to the same type of impact e.g. overgrazing and trampling or may result in another impact e.g. overgrazing and erosion. A total of 28 pressures were recorded as part of the survey. Frequency of the recorded pressures were calculated, with High impacting category assigned to activities that were recorded >5 times, Medium >2 and Low >1.
2.6 Main threats	As there is no evidence to suggest the decline of any of the listed pressures the list is the same for threats.

Field label	Note
Habitat code: 6130	
2.7.02 Typical species - method used	A number of lichens indicative of metalliferous substrates (Purvis and Halls, 1996), including Acarospora smaragdula, Psilolechia leprosa and Stereocaulon nanodes, amongst others, have been recorded from Calaminarian Grassland sites in Ireland (Giavarini, 2011a, 2011b) and could be used in future assessments of this habitat.
2.7.04 Structure and functions - Methods used	The habitats at 3 of the 28 sites were considered to be in poor condition, due to works on the site, litter build-up and fragmentation. These sites represent less than 2% of the national resource. Structure and functions for the habitat as a whole is assessed as FAVOURABLE.
2.7.05 Other relevant information	8 of the 28 surveyed sites are within 5 SACs (3 of which are selected for Calaminarian Grassland as a qualifying feature). However, these 8 sites include the two largest stands of the habitat in the county (Glendassan and Allihies) and together constitute 57% (7.8.ha) of the national resource.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	17 x 10 km squares harbour the habitat. This is greater than that recorded in the 2007 report, due to improved knowledge of the habitat. The favourable reference range is now set at the current range as there is no evidence of a decline in range since the Directive came into force. As this is an artificial habitat in Ireland, the ecological extent of variation is not considered. There is no evidence of a decline in range since the Directive came into force, therefore this range is assessed as FAVOURABLE.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	A total area of 13.58 ha was estimated from the 2008 field survey. Evidence of a slight recent decline in area was noted at 7 sites. However there is no available data to quantify this decline, thought to be very small and patchy. The area is unlikely to have declined by more than 1.5 ha in the last 10 years which would result in an unfavourable bad rating. Therefore this attribute is assessed as UNFAVOURABLE INADEQUATE.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Evidence of a slight recent decline in area was noted at 7 sites. However there is no available data to quantify this decline, thought to be very small and patchy. The area is unlikely to have declined by more than 1.5 ha in the last 10 years which would result in an unfavourable bad rating. Therefore this attribute is assessed as UNFAVOURABLE INADEQUATE and declining.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitats at 3 sites were considered to be in poor condition, due to works on the site, litter build-up and fragmentation. These sites represent less than 2% of the national resource. Structure & functions for the habitat as a whole is assessed as FAVOURABLE.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Over half sites were assessed as UNFAVOURABLE INADEQUATE. This was due to ongoing pressures, many of which will result in erosion and litter build up.The main issues at disused mine sites are that they are often seen as waste places, used for dumping, or abandoned to become overgrown with coarse vegetation as toxic metals leach out over time. Damaging but well intended maintanance and tidying of historic mine buildings can also cause loss of habitat.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Although long term leaching of toxic metals from mine spoil might lead to a decline in future prospects for this habitat, this will be counterbalanced by an increased awareness of the biological interest of such sites, and maintenance of suitable conditions for metallophyte vegetation through simple management procedures. The future prospects qualifier is therefore set as improving.

Field label	Note
Habitat code: 6130	
2.8.05 Overall assessment of Conservation Status	The detailed national survey by Holyoak (2008) provided new figures for Range and Area. As there is no evidence of decline in Range, it is assessed as Favourable. A slight decrease is area was noted at 7 of the 28 sites surveyed, so Area is assessed as Unfavourable inadequate. The development and extent of metallophyte communities, including occurrence of typical species, was used to assess the structure & functions, which is assessed as Favourable. However, ongoing pressures at many sites, including household dumping and abandonment to coarse vegetation as toxicity declines through leaching, means a future prospects assessment of Unfavourable inadequate. The overall assessment has been assessed as Unfavourable inadequate (stable) as any current pressures are likely to be negated by an increase in awareness and better site management.
2.8.06 Overall trend in Conservation Status	Overall assessment trend is considered to be stable, see section 2.8.4.b.
3.1.01 a) Surface area - Minimum	Estimated by summing the site area totals from the 2008 survey for the 8 sites known to occur within SACs.
3.1.01 b) Surface area - Maximum	Same as section 3.1.1.a.
3.1.02 Method used	See section 3.1.1.a.
3.1.03 Trend of surface area within the network	An estimated 57% of the known Calaminarian Grassland resource is within the SAC network. Losses were recorded in the biggest site, which is within the network, therefore the trend is declining.
3.2 Conservation measures	Calaminarian Grasslands that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Calaminarian Grassland is subject to the Environment Liability Regulations 2008. The survey by Holyoak (2008) and the Red Listing of some of the metallophyte bryophytes in Ireland (Lockhart et al., 2012) will enable some Calaminarian Grassland species to be legally protected under a revision of the Flora (Protection) Order.

Calaminarian Grassland (6130)
Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
24-04-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6210

NAME: Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchi

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2004-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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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 and Kilkenny Heritage Forum. Ireland.

NPWS (2007) Conservation Status Assessment Report: 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites). Unpublished Report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

NPWS (2009) Site Inspection Report (1998-2009). Unpublished data. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (in prep.) National survey of Irish semi-natural grasslands 2007-2012: mapping classification and assessment. Irish Wildlife Manuals, No. XX. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

O'Neill, F.H., Martin, J.R., Perrin, P.M., Delaney, A., McNutt, K.E. & Devaney, F.M. (2009) Irish Semi-natural grasslands survey. Annual Report No. 2: Counties Cavan, Leitrim, Longford & Monaghan. Unpublished report for NPWS.

O'Neill, F.H., Martin, J.R., Devaney, F.M., McNutt, K.E., Perrin, P.M. & Delaney, A. (2010) Irish Semi-natural grasslands survey. Annual Report No. 3: Counties Donegal, Dublin, Kildare & Sligo. Unpublished report for NPWS.

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, Site Report No. 12: Arroo Mountain SAC (001403), Co. Leitrim. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	21900	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1962-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	21900
	operator	N/A
	unknown	No
	method	The FRR was calculated on a 10 km square basis and is the same as the Range (2.3.1). There is some evidence that there has been a minor reduction in the south-western edge of the range over the last 50 years, but overall the range is assessed as stable. The FRR for the 6210 habitat is sufficient for it to obtain FCS.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	14.29		
2.4.2 Year or period	2004-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	much more than (>>)	
	unknown	No	
	method	The FRA is expected to be larger than the surface area reported in 2.4.1. Across much of its' range the 6210 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6210 habitat's typical species, including both plants and animals.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
species composition change (succession) (K02.01)	high importance (H)	N/A
problematic native species (I02)	high importance (H)	N/A
Fertilisation (A08)	medium importance (M)	Nitrogen input (N)
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
stock feeding (A05.02)	low importance (L)	N/A
intensive horse grazing (A04.01.03)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
species composition change (succession) (K02.01)	high importance (H)	N/A
problematic native species (I02)	high importance (H)	N/A
Fertilisation (A08)	medium importance (M)	Nitrogen input (N)
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
intensive horse grazing (A04.01.03)	medium importance (M)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
stock feeding (A05.02)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Anthyllis vulneraria

Arabis hirsuta

Brachypodium pinnantum

Bromopsis erecta

Carex caryophyllea

Carlina vulgaris

Centaurea scabiosa

Leontodon hispidus

Leontodon saxatilis

Primula veris

Sanguisorba minor

Antennaria dioica
Asperula cynanchia
Blackstonia perfoliata
Briza media
Campanula rotundifolia
Carex flacca
Daucus carota
Filipendula vulgaris
Galium verum
Gentianella campestris
Gentianella amarella
Geranium sanguineum
Helictotrichon pubescens
Homalothecium lutescens
Knautia arvensis
Koeleria macrantha
Linum catharticum
Lotus corniculatus
Origanum vulgare
Pilosella officinarum
Ctenidium molluscum
Thymus polytrichus
Gentiana verna
Dactylorhiza fuchsii
Gymnadenia conopsea
Orchis mascula
Listera ovata
Coeloglossum viride
Dactylorhiza maculata

2.7.2 Species method used	Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of two high quality species (usually species that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures) to pass the typical species component of the structure and functions assessment. The high quality species are Antennaria dioica, Anthyllis vulneraria, Asperula cynanchica, Blackstonia perfoliata, Briza media, Campanula rotundifolia, Carex caryophyllea, Carlina vulgaris, Centaurea scabiosa, Filipendula vulgaris, Gentiana verna, Gentianella amarella, Gentianella campestris, Geranium sanguineum, Knautia arvensis, Koeleria macrantha, Linum catharticum, Primula veris,Sanguisorba minor, and all orchid species. The typical species list for this

	habitat includes species that are characteristic, indicative, or common within the 6210 habitat in Ireland. In 2013 the list of typical species was reviewed based on the data collected during the ISGS. The list of typical species differs slightly from the one applied during the last reporting period (NPWS 2007), with the current list based on an extensive survey of 137 6210 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full account of the data presented in EU Commission Interpretation Manual (2007).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	See O'Neill et al. (in prep.) for a full list of the structure and functions criteria assessed. Features of the field and ground layers were assessed, including minimum/maximum thresholds for %cover within a 2m x 2m standardised plot. Criteria such as the cover of negative indicator species were also assessed. All assessment stops that failed structure and functions were checked to examine the reason for failure. When stops had only failed on one or two criteria the reasons for the stops failing were ascertained and expert judgement was applied to decide if the overall structure and functions was passable. After applying these criteria 74% of all ISGS assessment stops and 43% of ISGS sites had a Favourable assessment for structure and functions. When the area of each 6210 site was taken into account, 22% of the assessed area had Favourable structure and functions and 50% was Bad. Using similar criteria Wilson & Valverde (2013) assessed the 6210 habitat within 22 monitoring sites associated with limestone pavement and reported that 59% of sites had a Favourable assessment for structure and functions. The total area of habitat within SACs where it is a Qualifying Interest =7.77 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	9.58	max	9.58
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative Contractual Recurrent	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance

Field label	Note
Habitat code: 6210	
0.2 Habitat code	The Annex I habitat 6210 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. The Annex I habitat includes a mixture of grasses and herbs, with calcicole species typically frequent. It usually occurs on obvious geological features such as eskers, outcropping limestone rock and in association with limestone pavement. The Burren and Aran Islands (Clare/Galway) and Dartry Mountains (Sligo/Leitrim) are particularly important areas within the State for this Annex I habitat. The 6210 habitat is comprised of a diverse group of plant communities belonging to the Bromion-erecti, including the Carex flacca – Succisa pratensis community (O'Neill et al. in prep.), and CG1/CG2 (Rodwell 1992).
1.1.02 Method used - map	Field surveys carried out between 2007 and 2012 for the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and between 2009 and 2012 for the National Survey of Upland Habitats provide the majority of the data on which the assessment of 6210 is based. Data from Dwyer et al. (2007) and Wilson & Valverde (2013) are also important datasets. Grassland relevés collected by Austin O'Sullivan between 1962 and 1972 were also analysed against the 6210 structure and functions criteria utilised by O'Neill et al. (in prep.) and 68 of the relevés were considered to represent the 6210 habitat. As the O'Sullivan data are over 40 years old they were not utilised in calculating the current area or current range of the Annex I habitat, but they were utilised to inform the long-term trend. The two geological datasets (GSI 2006; Fealy et al. 2006) were used to confirm that all areas of 6210 were on, or, in a few cases, adjacent or surrounded by calcareous bedrock or substrate.
1.1.03 Year or period	Most of the data on which the assessment was based were collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and the National Survey of Upland Habitats (Perrin et al. 2013a; Perrin et al. 2013b). The data from Dwyer et al. (2007) were collected in 2006, and the Wilson & Valverde (2013) data were collected between 2008 and 2011. The earliest source used to derive the current distribution is the SAC site synopsis for Coole-Garryland complex (2004).
2.2 Published sources	O'Neill et al. (in prep.) used the data collected during the Irish Semi-natural Grassland Survey (ISGS) to refine the criteria for 6210 that were applied when writing this conservation assessment. The data from (Perrin et al. 2013a; Perrin et al. 2013b), Dwyer et al. (2007) and Wilson & Valverde (2013) were also important sources of data for the Annex I habitat. In addition, the data in the SAC site synopsis for Coole-Garryland complex (2004), Tubridy & Meehan (2006), Muyllaert & Jennings (2009), and Hickey & Tubridy (2008) were utilised in the production of this assessment.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	The majority of data on which the calculation of the current range was based was collected during the ISGS (O'Neill et al. in prep.). The data from Perrin et al. (2013a; 2013b), Dwyer et al. (2007) and Wilson & Valverde (2013) were also important sources of location data for the Annex I habitat.
2.3.03 Short-term trend - Period	The default trend period was used.

Field label	Note
Habitat code: 6210	
2.3.04 Short term trend - Trend direction	There is some evidence that the climatic factors that contribute to the range of this Annex I habitat have changed in the last 12 years (Leahy & Kiely 2011). This publication highlights the problems of increased flooding events in particular. Although it is expected that the reported changes in climate may be having some effect on the area of 6210 habitat no evidence was found for any short-term effect on the range of the habitat. The ISGS found evidence of some recent losses in the 6210 habitat area but none of these have impacted on the range of the habitat. It should be noted that the method used to calculate the range has changed since the 2007 reporting period, due to the use of the range tool. Also for the 6210 habitat a more comprehensive dataset has been collected since 2007 (O'Neill et al. in prep; Perrin et al. 2013a; Perrin et al. 2013b; Wilson & Valverde 2013) resulting in an improved understanding and definition for the habitat in Ireland and a more accurate distribution map on which to base the range.
2.3.06 Long-term trend - Period	The long-term trend period is best described from 1962 to 2012 as this is the period the main datasets cover.
2.3.07 Long-term trend - Trend direction	Comparing the geographical range of the 6210 sites recorded by Austin O'Sullivan between 1962 and 1972 and the ISGS between 2007 and 2012 there does appear to have been a slight reduction in the south-western edge of the range over the last 50 years, but overall the range is assessed as stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The range calculated for the 2001-2006 reporting period (NPWS 2007) was estimated, based on incomplete survey and reliant on predicting the likely occurrence of the habitat based on soil type, altitude, and the reported presence of indicator species within a 10 km grid square. Range calculated for the current reporting period is based on an almost complete nationwide survey of the habitat.
2.3.10 c) Reason for change - use of different method	The Range tool was employed to derive range rather than manual method used in 2007.
2.4.01 Surface area	Field surveys carried out between 2007 and 2012 for the ISGS (O'Neill et al. in prep.) and between 2009 and 2012 for the National Survey of Upland Habitats (Perrin et al. 2013a; Perrin et al. 2013b) provide the majority of the data on which the assessment of 6210 is based. Data from Dwyer et al. (2007) and Wilson & Valverde (2013) are also important datasets. In addition, the data in Tubridy & Meehan (2006), Muyllaert & Jennings (2009), and Hickey & Tubridy (2008) were utilised when calculating the current area of 6210. The two geological datasets (GSI 2006; Fealy et al. 2006) were used to confirm that all areas of 6210 were on, or in a few cases adjacent or surrounded, by calcareous bedrock or substrate. The 14.29 km2 surface area for 6210 reported here is probably a significant underestimation of the total area of the habitat in Ireland.
2.4.02 Year or period	Most of the data on which the assessment was based were collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and the National Survey of Upland Habitats (Perrin et al. 2013a; Perrin et al. 2013b). The data from Dwyer et al. (2007) were collected in 2006, and the Wilson & Valverde (2013) data were collected between 2008 and 2011. The earliest source used to derive the current distribution is the SAC site synopsis for Coole-Garryland complex (2004).

Field label	Note
Habitat code: 6210	
2.4.05 Short-term trend - Trend direction	For 137 ISGS sites containing 6210 the area of the Annex I habitat mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep). Due to the steep nature of many of these sites and the difficulties in observing more subtle changes in the nature of grassland, such as fertiliser application, any observed differences are probably an under representation of the true nature of the change. Of these 137 sites a loss in area of 11.26 ha was observed over 18 sites, with most of this loss due to scrub or heath encroachment. 10 of the 137 sites showed a small increase in the area of 6210 of 0.4ha, mostly due to the recovery of quarried areas or bare ground. Although the observable loss in area nationally is 0.8% the short-term trend direction is considered stable.
2.4.07 Short-term trend - Method used	Short-term trend direction is based on the 137 ISGS sites containing 6210 that were surveyed between 2007 and 2012. For each of these sites the area of 6210 mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep.). Due to the steep upland nature of many of these sites and the difficulties in observing more subtle changes in the nature of grassland, such as fertiliser application, any observed differences are probably an under representation of the true nature of the change.
2.4.09 Long-term trend - Trend direction	As 6210 grassland is a not a climax community it relies on extensive agricultural practices, usually cattle grazing, to maintain the habitat over almost all of its range. Over the last 24 years there has been a decline in the area of this habitat due to factors such as agricultural intensification in more accessible sites and agricultural abandonment and succession to scrub in inaccessible sites.
2.4.13 a) Reason for change - genuine change?	The ISGS data collected between 2007 and 2012 have shown than there has been little change in the area of this Annex I habitat (section 2.4.5) during the reporting period.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The reported surface area for 6210 of 14.29 km2 is much lower than the area of 531 km2 reported for the previous period (2001 to 2006). The reason for the decrease in area is due to the current report being based on a complete dataset (O'Neill et al. in prep.), the figure in the 2006 report was an estimate.
2.5 Main pressures	The pressures listed are based on data presented in O'Neill et al. (in prep.). The Sites Inspection Reports (SIR) of NPWS rangers was also consulted and the two most frequently scored pressures of agricultural intensification/improvement, and stock feeding were incorporated. The pressures listed for the 6210 habitat by Wilson & Valverde (2013) were also consulted.

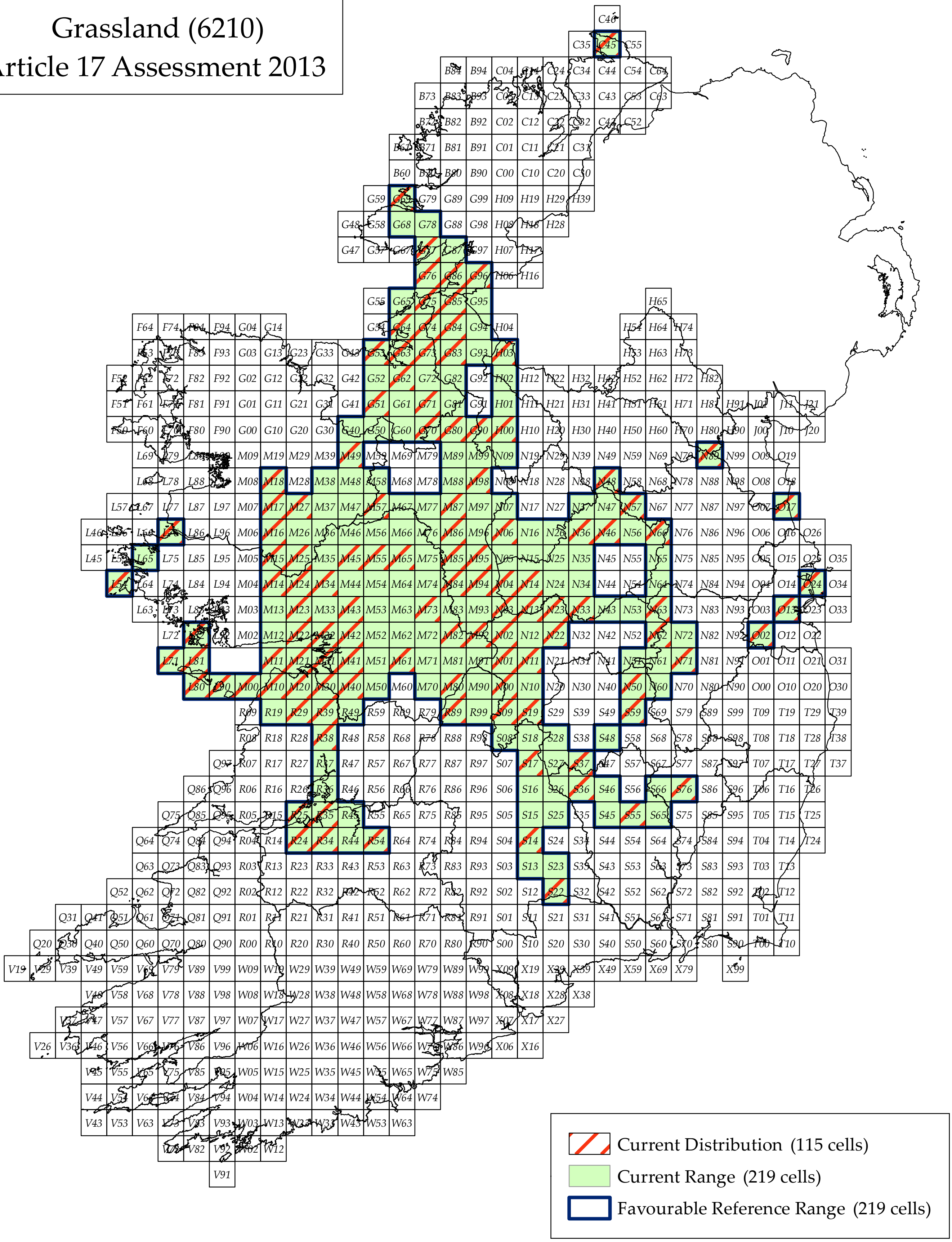
Field label	Note
Habitat code: 6210	
2.5.01 Method used - pressures	Based on the data published in O'Neill et al. (in prep.) succession to scrub and problematic native species (e.g. bracken) are the two main reported pressures on the habitat. Due to the fact that the more detailed updated activity codes were utilised from 2010, the frequency data presented is based on the 99 6210 sites surveyed from 2010 to 2012. Succession to scrub was recorded at 50% of 6210 sites, often at a medium intensity. Problematic native species was recorded at 46% of sites, often at a medium intensity. The high frequency of both succession to scrub and problematic native species within the State meant that they were ranked as high importance pressures. Wilson & Valverde (2013) reported succession to scrub as the main pressure effecting 6210 habitats associated with limestone pavement, with the pressure reported at 50% of the eight sites where a pressure was reported. O'Neill et al. (in prep.) recorded the pressures of agricultural intensification and improvement using impacts such as agricultural intensification, fertilisation, intensive cattle grazing, and intensive horse grazing, overall these were recorded at a small number of sites (16%), but this was partly due to the fact that it can be difficult to observe some of these impacts, such as fertilisation, actually taking place during one field visit. Abandonment of pastoral systems/ lack of grazing was only recorded at 3% of sites and is probably only of medium importance nationally for the 6210 habitat. Over the last 24 years quarrying has been a pressure on the 6210 habitat, however active quarries were only observed adjacent to sites during the ISGS. When extraction activities at a quarry have ceased if the site is managed favourably (e.g. extensive grazing) and there is an adjacent donor 6210 community natural recolonisation will often re-establish the Annex I habitat. The previous conservation assessment for this habitat (NPWS 2007) listed a very similar list of pressures for the 6210 habitat.
2.6 Main threats	The threats listed are based on the pressures from section 2.5 a. It is considered that each of the pressures noted in 2.5 are common impacts that will continue to have a negative effect on the conservation status of the 6210 habitat over future reporting periods (specifically the next 12 years). Long (2011) presented data that highlighted the implications of abandonment of pastoral systems showing how vascular plant diversity within calcareous grasslands decreased once land was abandoned and grazing ceased.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Over the short-term the range of the 6210 habitat is stable. The data seems to indicate that the current range is very similar to the FRR (section 2.3.7). There has been a slight reduction in the south-western edge of the range, in Co. Limerick, over the last 50 years, but overall the range is assessed as Favourable.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	There is no evidence from the ISGS dataset that overall range has declined significantly during the last reporting period and it is considered to be stable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The data presented in Section 2.4.5 shows that the 6210 area has declined by at least 11.26 ha over the last 12 years (from comparing areas mapped during the ISGS with areas visible on aerial photos taken in 2000), this represents a 0.8% loss of the Annex I habitat nationally. Although the short-term decline appears to be relatively small the vulnerability of the 6210 habitat to agricultural improvements that have taken place over the last 50 years, and to processes such as succession, that have probably occurred more recently, leads to the conclusion that the current area of 6210 is significantly less than the FRA. For this reason, the area of 6210 is assessed as Bad.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The area is considered to be stable within the current reporting period and therefore the qualifier for area is stable. However, problems such as succession to scrub must be tackled to prevent further losses in area.

Field label	Note
Habitat code: 6210	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The 137 6210 grassland sites monitored between 2007 and 2012 (O'Neill et al. in prep.) were used as a proxy for the national resource of this Annex I habitat. When deciding on the thresholds used to assess the national status of structure and functions, the following criteria were applied. If >99% of the assessed area within Ireland has a favourable status, then structure and functions are favourable nationally. If >=25% of the assessed area has a status of Bad, then structure and functions are bad nationally. Any other situation results in a national assessment of Inadequate. As only 22% of the area of 6210 assessed during the current reporting period had a Favourable structure and functions, the national assessment for 6210 is Bad. On the positive side, none of the individual criteria used to assess the structure and functions of stops had a low pass rate, forb component with a pass rate of 88% was the lowest. In the future there is an argument for expanding the range of typical species and for ecologists to propose more specific typical species lists that assess the structure and functions of a particular site. It would also be expected that in the future fauna, as well as flora, would be utilised for many sites. However, to assist ecologists in the identification of the 6210 habitat a list of typical species that are particularly characteristic, indicative, or common for the habitat in Ireland has been proposed.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structure and functions is considered to be stable. This current report shows that for 22% of the assessed area of the 6210 habitat the structure and functions were reported as Favourable; 50% were reported as Bad with the remainder Inadequate. These data represent an improvement on the 68% of the assessed area reported as Bad in the last reporting period (NPWS 2007). As the number and locations of the assessed areas are very different it was concluded that the data indicate a stable trend.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters is Bad and considered to remain bad for the foreseeable future (12 years) the future prospects are assessed as Bad. An assessment of Bad was made for the last reporting round (NPWS 2007). Table to assess 6210 parameters Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / <FRV / =stable / <FRV / Bad S&F / <FRV / =stable / <FRV / Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Based on the findings of this assessment and the assessment of 6210 that took place in the previous reporting period (NPWS 2007) the future prospects for this habitat are probably Bad but stable with the future trend for range, area, and structure and functions predicted to be stable.

Field label	Note
Habitat code: 6210	
2.8.05 Overall assessment of Conservation Status	The Annex I habitat 6210 is not at FCS. The reasons for this are that the current area, and structure and functions of the 6210 habitat are below the FRVs. It should be noted that the area and current range reported here are much smaller than the figures reported in 2006, with the 6210 area decreasing from 531 km2 to 14.29 km2. This decrease in area is due to improved knowledge arising from the NPWS undertaking a national survey for the habitat between 2007 and 2012. The figure reported in 2006 was an estimate. The current range and area for the 6210 habitat are stable. The structure and functions that are necessary for the long-term maintenance of the habitat are below the FRV. Currently the FRV for structure and functions has been set nationally which assists habitat identification on a national scale but fails to take account of all the regional and local variation within the habitat. It is expected that as the monitoring programme for 6210 is developed and our understanding of the local variability within the structure and functions of the 6210 habitat increases the FRV for structure and functions will be set at a local or site specific level. If this more localised approach is taken it would be expected that over time a larger proportion of sites would attain Favourable status for structure and functions. As area and structure and functions were assessed as Bad the overall assessment of conservation status is Bad, the overall assessment for the habitat was also Bad in 2007 (NPWS 2007).
2.8.06 Overall trend in Conservation Status	The 6210 habitat is usually associated with farmland that is less amenable to agricultural improvement, such as steeply sloping ground and thin rocky soil. Therefore the 6210 habitat is probably more threatened by the abandonment of these areas, and subsequent succession, than by agricultural improvement. It would be expected that agri-environment schemes and the implementation of Natura 2000 management plans would improve the management of the 6210 habitat within the State and contribute to the Annex I habitat moving towards FCS. There is evidence that schemes such as the Burren Farming for Conservation Programme (Anon. 2013) and the NPWS farm plan initiatives are starting to have a positive effect in the areas where they have been implemented. However, as these positive initiatives are yet to be implemented across a significant proportion of the range of the 6210 habitat the trend will remain stable in line with the stable future prospect listed in 2.8.4 b.
3.1.01 a) Surface area - Minimum	The area of 6210 habitat within Natura 2000 sites is a minimum known area, with only areas that have evidence for the presence of the Annex I habitat mapped. There are two SACs that have6210 listed as a Qualifying Interest but have no overlap with the 6210 10k distribution. Both SAC 000714 (Bray Head) and SAC 000859 (Clonaslee Eskers and Derry Bog) have the 6210 habitat listed with D level representivity. Sections of SAC 000714 were surveyed during the ISGS (site 3100) but no evidence for the 6210 habitat was found.
3.1.01 b) Surface area - Maximum	It is unknown what the maximum is and therefore a nominal figure equal to the minimum has been entered.
3.1.03 Trend of surface area within the network	As the trend for 6210 area (Section 2.4.5) is assessed to be stable, the trend for area within the SAC network was also assessed as stable.

Field label	Note
Habitat code: 6210	
3.2 Conservation measures	Within the current reporting period O'Neill et al. (in prep.) reported non-intensive grazing as a positive or neutral activity at 87% of the 6210 sites, cattle were the most frequent grazer reported. The next most frequent positive impacts were non-intensive mowing, and the removal of scrub, each reported at 4% of sites. A significant proportion of the 6210 habitat is located within SACs which together with the legal protection of the Annex I habitat should maintain the conservation status. The effectiveness of protected areas and the legal protection provided to the 6210 habitat have yet to be evaluated. A small proportion of 6210 sites include protected species such as Green-winged orchid (Orchis morio) that could enhance the conservation status of a site. The 6210 habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Also Environmental Impact Assessment (EIA) by regulatory authorities protects the habitat from damage. Regional conservation projects are also impacting positively on the status of the 6210 habitat. Wilson & Valverde (2013) report on initiatives in improved landuse management by the BurrenLIFE Project and Burren Farming for Conservation Programme (Anon. 2013) that aim to reduce current pressures and future threats ,such as inappropriate grazing regimes and scrub encroachment, on the 6210 habitat within the Burren area.

Orchid-rich Calcareous Grassland (6210) Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
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Date - Dáta
05-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6230

NAME: Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Eu

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (in prep.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2. Irish Wildlife Manuals, No. XX. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P.M., Roche, J.R., Barron, S.J. & Daly, O.H. (2012) National Survey of Upland Habitats (Phase II, 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.

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Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	11700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	11700
	operator	N/A
	unknown	No
	method	The FRR was calculated on a 10 km square basis and is the same as the Range (2.3.1). The FRR for the 6230 habitat is sufficient for it to obtain FCS.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	6.42		
2.4.2 Year or period	1994-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period	1991-2012		
2.4.9 Long-term trend direction	decrease (-)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	much more than (>>)	
	unknown	No	
	method	The FRA is expected to be larger than the surface area reported in 2.4.1; the FRA has a minimum value of 6.85 km2 due to the reported loss in 6230 habitat (NPWS 2007) of 0.43 km2. Across much of its' range the 6230 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6230 habitat's typical species, including both plants and animals.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Pressure	ranking	pollution qualifier(s)
problematic native species (I02)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	low importance (L)	Nitrogen input (N)
Forest and Plantation management & use (B02)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
problematic native species (I02)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	low importance (L)	Nitrogen input (N)
Forest and Plantation management & use (B02)	low importance (L)	N/A
forest planting on open ground (B01)	low importance (L)	N/A
Fertilisation (A08)	low importance (L)	Nitrogen input (N)
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Alchemilla glabra
Antennaria dioica
Campanula rotundifolia
Conopodium majus
Ctenidium molluscum
Linum catharticum
Lotus corniculatus
Lysmachia nemorum
Primula vulgaris
Prunella vulgaris
Thymus polytrichus
Breutelia chrysocoma

Carex caryophyllea
Carex pilulifera
Danthonia decumbens
Lathyrus linifolius
Pseudorchis albida
Viola canina
Viola riviniana
Agrostis capillaris
Anthoxanthum odoratum
Carex binervis
Festuca ovina
Galium saxatile
Hylocomium splendens
Luzula multiflora
Luzula campestris
Nardus stricta
Polygala serpyllifolia
Potentilla erecta
Rhytidiadelphus loreus
Rhytidiadelphus squarrosus
Veronica officinalis

2.7.2 Species method used

Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.; Perrin et al. in prep.; Perrin et al. 2012; Perrin et al. 2011; Perrin et al. 2009; Roche et al. 2011). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of two high quality species for the calcareous sub-community, or one high quality species for the acidic sub-community if the assessment was to pass the typical species component of the structure and functions assessment. High quality species are those that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures. The high quality species for the acidic sub-community are Lathyrus linifolius, Breutelia chrysocoma, Pseudorchis albida, Carex caryophyllea, Carex pilulifera, Viola canina, and Danthonia decumbens, for the calcareous sub-community they are Antennaria dioica, Alchemilla glabra, Campanula rotundifolia, Conopodium majus, Ctenidium molluscum, Linum catharticum, Lotus corniculatus, Lysmachia nemorum, Primula vulgaris, Prunella vulgaris, and Thymus polytrichus. The typical species list for this habitat includes species that are characteristic, indicative, or common within the 6230 habitat in Ireland. In 2012 the list of typical species was reviewed based on the data collected during the ISGS and NSUH.
The list of typical species differs slightly from the one applied during the last reporting period (NPWS 2007), with the current list based on an extensive survey 6230 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full

	account of the data presented in EU Commission Interpretation Manual (2007).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	See O'Neill et al. (in prep.) for a full list of the structure and functions criteria assessed. Features of the field and ground layers were assessed, including minimum/maximum thresholds for %cover within a 2m x 2m standardised plot. Criteria such as the cover of negative indicator species were also assessed. All assessment stops that failed structure and functions were checked to examine the reason for failure. When stops had only failed on one or two criteria the reasons for the stops failing were ascertained and expert judgement was applied to decide if the overall structure and functions was passable. After applying these criteria 55% of all ISGS assessment stops and 50% of NSUH stops passed and 44% of ISGS sites had a Favourable assessment for structure and functions (separate data not presented for NSUH sites as they overlap with the ISGS list of sites i.e. many sites were surveyed by both projects). However, when the area of all 6230 habitat surveyed by the ISGS and NSUH was taken into account, only 9% of the assessed area had Favourable structure and functions and 75% was Bad. The total area of habitat within SACs where it is a Qualifying Interest =2.19 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	declining (-)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	3.93	max	3.93
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	unknown (x)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative Contractual Recurrent	high importance (H)	Both	Enhance

Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance

Field label	Note
Habitat code: 6230	
0.2 Habitat code	The Annex I habitat 6230 is restricted to siliceous substrates in upland areas (montane and submontane zone). 6230 has probably always been a rare habitat within Irish uplands and it relies on extensive grazing, usually sheep, to maintain the habitat over almost all of its range. When 6230 grassland is identified it can often occur in a mosaic with heath. Mineral flushing is usually required to create a habitat that supports a more species-rich community that conforms to the Annex I habitat as described in the interpretation manual of EU habitats (European Commission 2007). Both a calcareous (calcareous flushing) and non-calcareous sub-community of 6230 have been identified in Ireland.
1.1.02 Method used - map	Field surveys carried out between 2007 and 2012 for the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and between 2009 and 2012 for the National Survey of Upland Habitats (Perrin et al. in prep.; Perrin et al. 2012; Perrin et al. 2011; Perrin et al. 2009; Roche et al. 2011) provide the majority of the data on which the assessment of 6230 is based. Data from Dwyer et al. (2007), data collected for the Coillte Biodiversity Dataset between 2000 and 2007 (Coillte 2007), NPWS (2012), relevés collected by Burke in 2001 (O'Donovan 2007), plus information collected from the Natura 2000 form and associated NPWS documents are the remaining data sources on which the national assessment of the 6230 habitat was based. The two geological datasets (GSI 2006; Fealy et al. 2006) were used to confirm that all areas of 6230 were on, or in a few cases adjacent or surrounded, by acid bedrock or substrate.
1.1.03 Year or period	Most of the data on which the assessment was based was collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and the National Survey of Upland Habitats (Perrin et al. in prep.). The data from Dwyer et al. (2007) was collected in 2006, the Coillte Biodiversity Dataset was collected from 2000 to 2007. The earliest source used to derive the current distribution is the NPWS data for Connemara Bog Complex SAC (SAC 002034) collected in 1994.

Habitat code: 6230

Field label	Note
2.2 Published sources	Perrin et al. (in prep.) and O'Neill et al. (in prep.) define the assessment criteria for 6230 that were applied when writing this conservation assessment. The National Survey of Upland Habitats (data collected from 2009 to 2012) and the Irish Semi-natural Grasslands Survey (data collected from 2007 to 2012) provided the data for these two publications and between them these field surveys have sampled many of the areas where the Annex I habitat 6230 is thought to occur. Although the National Survey of Upland Habitats (NSUH) has not surveyed any upland areas in Co. Cork, this county, including the Caha, Boggeragh and Nagles mountains, was surveyed for 6230 by the Irish Semi-natural Grasslands Survey (ISGS) in 2008. The NSUH has also not surveyed the Slieve Blooms, but the area of these mountains within Co. Offaly was surveyed by the ISGS in 2007. Obvious omissions from the ISGS and NSUH surveys are the Wicklow and Blackstairs mountains in the east, the Slieve Blooms (Co. Laois section) in the centre, and the Macgillycuddy's Reeks and Connemara Mountains in the west. Other published data sources were consulted to try and confirm the presence of 6230 within these areas. Dwyer et al (2007) provided data that was utilised in the production of this conservation assessment. However, the assessment criteria for this Annex I habitat have been updated since the publication of Dwyer in 2007. In particular, there is now a requirement that examples of this Annex I habitat are species-rich (defined as > 24 species within a 2 x 2 m relevé) and the list of typical species for the habitat has been extended to include species typical of siliceous grassland with calcareous/mineral flushing, communities within this Annex I habitat that are often particularly diverse. NPWS (2012) provided polygon data on the 6230 habitat within the Connemara mountains. Although there were no relevés available to assess the validity of this mapping it was decided to include these areas, but with a lower level of certainty. Each of the 6230 polygons were confirmed as grassland habitat using the 2005 aerial photographs. O'Donovan (2007) provided a synopsis of the status of the Annex I habitat within the Wicklow Uplands SAC and two of the relevés utilised during this study (collected by Burke in 2001) were considered to be examples of 6230 (although they did not quite meet the species diversity criterion) following the criteria utilised by Perrin et al. (in prep.) and O'Neill et al. (in prep.). The Coillte Biodiversity Dataset (Coillte 2007) is a GIS shapefile that contains polygons. Although there were no relevés available to assess the validity of this mapping it was decided to include these areas, but with a lower level of certainty. Each of the 6230 polygons were confirmed as grassland habitat using the 2005 aerial photographs. The data utilised from the Natura 2000 forms and associated NPWS documents included general locations and lists of the vascular plant species that were found in these locations. These data helped define two areas of the 6230 habitat within the Connemara Bog Complex SAC (SAC 002034). The Laois Habitat Survey Phase V (Hickey & Tubridy 2009) did include an area of the Slieve Bloom Mountains SAC, where upland siliceous bedrock occurs, but the two areas that were mapped as dry-humid acid grassland do not appear to be suitable candidate sites for the 6230 habitat when viewed on the 2005 aerial photographs. Also the species list for dry-humid acid grassland published in the report does not include the requisite number of high quality indicator species to meet the criteria listed in O'Neill et al. (in prep.). The Macgillycuddy's Reeks were a major study site in Hodd (2013) but this study noted no significant areas of the 6230 habitat within the mountain range. The data within Conaghan et al. (2011) was reviewed but as stated by the authors none of the documented locations for the species were recorded within the 6230

Field label	Note
	habitat.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	The majority of data on which the calculation of the range was based was collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and the National Survey of Upland Habitats (Perrin et al. in prep.). Data was also utilised from the other data sources discussed in Section 2.2.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is some evidence that the climatic factors that contribute to the range of this Annex I habitat have changed in the last 12 years (Leahy & Kiely 2011). This publication highlights the problems of increased flooding events in particular. Although it is expected that the effects reported may be having some effect on the area of 6230 habitat no evidence was found for any short-term effect on the range of the habitat. There is evidence of some recent losses in the 6230 habitat area but none of these have impacted on the range of the habitat. It should be noted that the method used to calculate the range has changed since the 2007 reporting period, due to the use of the range tool. Also for the 6230 habitat a more comprehensive dataset has been collected since 2007 (Perrin et al. in prep, O'Neill et al. in prep) resulting in improved understanding and definition for the habitat in Ireland and a more accurate distribution map on which to base the range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The range calculated for the 2001-2006 reporting period (NPWS 2007) was estimated, based on incomplete survey and reliant on predicting the likely occurrence of the habitat based on soil type, altitude, and the reported presence of indicator species within a 10 km grid square. Range calculated for the current reporting period is based on an almost complete nationwide survey of the habitat.
2.3.10 c) Reason for change - use of different method	The Range tool was employed to derive range rather than manual method used in 2007.

Field label	Note
Habitat code: 6230	
2.4.01 Surface area	Surface area is based on the 6230 mapping carried out by Perrin et al. (in prep.) and O'Neill et al. (in prep.). The National Survey of Upland habitats (NSUH) 2009 to 2012 and the Irish Semi-natural Grasslands Survey (ISGS) 2007-2012 provided the data for these two publications and between them these field surveys have sampled many of the areas where the Annex I habitat 6230 is thought to occur. Obvious omissions are the Wicklow and Blackstairs mountains in the east, the Slieve Blooms (Co. Laois section) in the centre, and the Macgillycuddy's Reeks and Connemara mountains in the west of Ireland. Other published data sources were consulted to try and confirm the presence of 6230 within these areas and map polygons of this habitat. The Coillte Biodiversity Dataset (Coillte 2007) is a GIS shapefile that contains polygons that were mapped as 6230 by credible sources. Although there were no relevés available to assess the validity of this mapping it was decided to include these areas but with a lower level of certainty. Each of the 6230 polygons were confirmed as grassland habitat using the 2005 aerial photographs and Google maps. NPWS (2012) provided polygon data on the 6230 habitat within the Connemara mountains. Although there were no relevés available to assess the validity of this mapping it was decided to include these areas, but with a lower level of certainty. Each of the 6230 polygons were confirmed as grassland habitat using the 2005 aerial photographs. The data utilised from the Natura 2000 forms and associated documents (NPWS data sources) included general locations and lists of the vascular plant species that were found in these locations. These data helped define two areas of the 6230 habitat within the Connemara Bog Complex SAC (SAC 002034). As stated in the background notes for Section 2.2, the Laois Habitat Survey Phase V (Hickey & Tubridy 2009) was studied but was found not to include any credible areas of 6230. Areas of 6230 mapped by Dwyer et al. (2007) that included an assessment stop that met the basic criteria of > 6 high quality and general typical species (Perrin et al. in prep.; O'Neill et al. in prep.) and had a general description that indicated an area of species-rich 6230 were also included. The two 6230 relevés; although they did not quite meet the species diversity criteria utilised by O'Neill et al. (in prep.), recorded by Burke in 2001 (O'Donovan 2007) were mapped using the 2005 aerial photographs. Areas of 6230 were mapped within the Blackstairs Mountains SAC based on 2005 aerial photos. These two areas are expected to contain 6230 due to the presence of a relevé recorded at the base of the mountain during the Irish Semi-natural Grasslands Survey that included > 6 high quality and general typical species for the 6230 habitat. The data utilised from the Natura 2000 forms and associated NPWS documents included general locations mapped to a 6 inch scale. These data helped define two areas of the 6230 habitat within the Connemara Bog Complex SAC (SAC 002034). When calculating the final area for the 6230 habitat two geological GIS datasets, Bedrock_100 (Anon. 2006) and Soils_ie (Fealy et al. 2006) were used to confirm that all areas of 6230 were on, or in a few cases adjacent or surrounded, by siliceous bedrock or substrate. The surface area for 6230 reported here is probably an underestimate of the total area of the habitat in Ireland.

Field label	Note
Habitat code: 6230	
2.4.02 Year or period	Most of the data on which the range was calculated were collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) and the National Survey of Upland Habitats (Perrin et al. in prep.). The data from Dwyer et al. (2007) was collected in 2006, the Coillte Biodiversity Dataset was collected from 2000 to 2007. The earliest source used to derive the current range is the NPWS data for Connemara Bog Complex SAC (SAC 002034) collected in 1994.
2.4.05 Short-term trend - Trend direction	For 37 ISGS sites containing 6230 the area of the Annex I habitat mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep). Due to the steep nature of many of these sites and the difficulties in observing more subtle changes in the nature of grassland, such as fertiliser application, any observed differences are probably an under representation of the true nature of the change. Of these 37 sites a loss in area of 0.36 ha was observed over four sites, with most of this loss due to scrub or heath encroachment. Two of the 37 sites showed a very small increase in the area of 6230. Although the observable loss in area nationally is only 0.06% the short-term trend direction is considered stable.
2.4.07 Short-term trend - Method used	Short-term trend direction is based on the 37 ISGS sites containing 6230 that were surveyed between 2007 and 2012. For each of these sites the area of 6230 mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep.). Due to the steep upland nature of many of these sites and the difficulties in observing more subtle changes in the nature of grassland, such as fertiliser application, any observed differences are probably an under representation of the true nature of the change.
2.4.08 Long-term trend - Period	Defined by the range of dates for the data sources. The earliest data source utilised was collected by Fitzgerald (1991).

Field label	Note
Habitat code: 6230	
2.4.09 Long-term trend - Trend direction	As 6230 grassland is a not a climax community and it relies on extensive agricultural practices, usually sheep grazing, to maintain the habitat over almost all of its range. Over the last 24 years there has been a decline in the area of this habitat due to factors such as the planting of conifer plantations in upland areas, agricultural intensification in more accessible sites and agricultural abandonment in inaccessible upland sites. Five locations where the 6230 habitat was recorded by Austin O'Sullivan in the 1960s (Bourke et al. 2007) were examined and the habitat was still extant at three of the sites and had almost certainly disappeared at the remaining two due to either agricultural improvement or the planting of coniferous forestry. NPWS (2007) did apply slightly different criteria to define the 6230 habitat, but the reporting of a loss of approximately 43 ha of the 6230 habitat between 1991 and 2006 at Kilduff, Devilsbit Mountain (SAC 000934), due to agricultural improvement, is the most significant reported loss representing 7% of the current reported area of 6230. Fitzgerald (1991) while searching for historic records for the high quality indicator for the 6230 habitat, Pseudorchis albida, found that many of the records for this species that were recorded during the 19th and 20th century were now extinct. Fitzgerald (1991) concluding that 'in many areas with former records in this region of Ireland (e.g. Comeragh Mountains, the Devils Bit range, the Slieve Blooms), forestry has completely obliterated the zone.' The zone referred to is the heathy grassland between intensively farmed fields and moorland, where 6230 is often found in a mosaic with heath. All these data indicate that the area of the 6230 habitat has declined over the long-term.
2.4.12 a) Favourable reference area - In km2	The FRA is expected to be larger than the surface area reported in 2.4.1; the FRA has a minimum value of 6.85 km2 due to the reported loss in 6230 habitat (NPWS 2007) of 0.43 km2. Across much of its' range the 6230 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6230 habitat's typical species, including both plants and animals.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The surface area for 6230 was not reported in 2007 due to insufficient data. Since 2007 there has been a national survey of semi-natural grassland, which included some areas of upland grassland, and a survey of a significant portion of the upland grassland areas within Ireland. The data from these surveys together with the data reported in the other publications listed in Section 2.2 has allowed the area of 6230 within the State to be mapped for the first time.
2.5 Main pressures	The pressures listed are based on data presented in O'Neill et al. (in prep.) and the NSUH reports (Perrin et al. in prep.; Perrin et al. 2012; Perrin et al. 2011; Perrin et al. 2009; Roche et al. 2011). The Sites Inspection Reports (SIR) of NPWS rangers was also consulted and three reported impacts were noted. However, due to recent changes in the definition of the 6230 habitat within Ireland and possible misidentification of the habitat it was decided not to incorporate the three SIR records in the list of pressures.

Field label	Note
Habitat code: 6230	
2.5.01 Method used - pressures	Based on the data published in O'Neill et al. (in prep.) problematic native species (e.g. bracken) and succession to scrub are the two main reported pressures on the habitat. Due to the fact that the more detailed updated activity codes were utilised from 2010, the frequency data presented is based on the 21 6230 sites surveyed from 2010 to 2012 that had activity codes listed. Problematic native species was recorded at 24% of sites, often at a medium or high intensity. Succession to scrub was also recorded at 24% of sites but often at a lower intensity. All the other pressures recorded in this report were recorded at less than 5 sites, usually at low intensity and often in a small proportion of the Annex I habitat. Although a pressure may be scored as low intensity nationally it should be noted that it could be a high intensity pressure at one particular site. The previous conservation assessment for this habitat (NPWS 2007) had also found problematic native species (e.g. bracken) and succession to scrub were the two main pressures on the 6230 habitat.
2.6 Main threats	The threats listed are based on the pressures from section 2.5 a. It is considered that each of the pressures noted in 2.5 a are common impacts that will continue to have a negative effect on the conservation status of the 6230 habitat over future reporting periods (specifically the next 12 years). Three additional threats were added, that were not recorded under pressures due to difficulties in recording their presence during one-off site visits. Fertilisation was added as the improvement of marginal land through fertilisation and reseeding continues to have an impact on the 6230 habitat. Forest planting on open ground will continue to be a threat to the 6230 habitat due to the continued trend in Ireland of planting conifer plantations on marginal agricultural land and the technical difficulties associated with the foresters and ecologists involved with planting recognising the 6230 habitat. It is also expected that climate change could be a threat to the 6230 habitat over future reporting periods.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Over the short-term the range of the 6230 habitat is stable The data seems to indicate that the current range is similar to the FRR and for this reason the FRR is set at the current range and the overall assessment for range is Favourable.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	There is no evidence from the ISGS dataset that overall range has declined significantly during the last reporting period and it is considered to be stable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The data presented in Section 2.4.5 shows that the 6230 area has only declined by 0.06% over the last 12 years (from comparing areas mapped during the ISGS with areas visible on aerial photos taken in 2000). However, there are significant examples listed in this document, Fitzgerald (1991), and NPWS (2007) that show that the current area is less than the historic area and some of these losses in area could have occurred during the last two reporting periods. The vulnerability of the 6230 habitat to agricultural improvements and afforestation that have taken place over the last 50 years, and to processes such as succession, that have probably occurred more recently, leads to the conclusion that the current area of 6230 is significantly less than the FRA. For this reason, the area of 6230 is assessed as Bad.

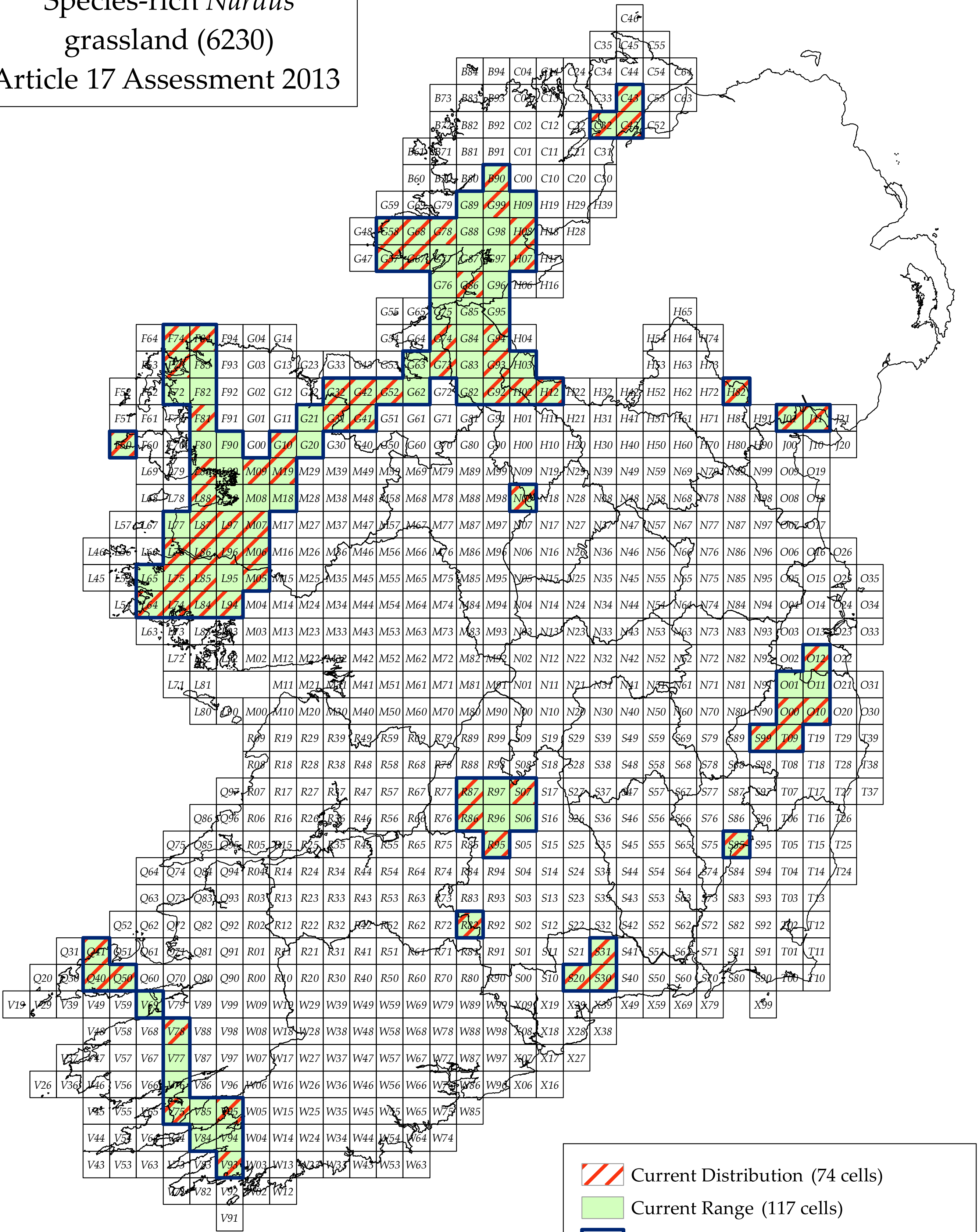
Field label	Note
Habitat code: 6230	
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The 6230 area appears to be stable within the current reporting period, but due to the fact that losses in area due to afforestation have probably been significantly under-recorded during recent surveys it is the view of the NPWS that the area of 6230 within the State is declining. It should be noted that in the longer term (last 24 years) there are examples (Fitzgerald 1991, NPWS 2007) that the area of 6230 has declined significantly (see section 2.4.9). In the future the problems of agricultural improvement, afforestation and succession must be tackled to prevent further losses in area.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The 37 6230 grassland sites monitored between 2007 and 2012 (O'Neill et al. in prep.) and the 8 upland sites that contained 6230 that were monitored between 2007 and 2012 (Perrin et al. in prep.) were used as a proxy for the national resource of this Annex I habitat. When deciding on the thresholds used to assess the national status of structure and functions, the following criteria were applied. If >99% of the assessed area within Ireland has a favourable status, then structure and functions are favourable nationally. If >=25% of the assessed area has a status of Bad, then structure and functions are bad nationally. Any other situation results in a national assessment of Inadequate. As 75% of the area of 6230 assessed during the current reporting period had a Bad structure and functions the national assessment for 6230 is Bad. In the future there is an argument for expanding the range of typical species and for ecologists to propose more specific typical species lists that assess the structure and functions of a particular site, it would also be expected that in the future fauna, as well as flora, would be utilised for many sites. However, to assist ecologists in the identification of the 6230 habitat a list of typical species that are particularly characteristic, indicative, or common for the habitat in Ireland has been proposed.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The 2007 report on this habitat was only based on seven sites and all sites were reported to have Bad structure and functions. This current report shows that for 75% of the assessed area of the habitat the structure and functions was reported as Bad, which is an improvement on 100% of the assessed area reported as Bad in the last reporting period (NPWS 2007). Although, as the number and location of the assessed areas is very different it was concluded that the data indicate a stable trend.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters is Bad and considered to remain bad for the foreseeable future (12 years) the future prospects is assessed as Bad. An assessment of Bad was made for the last reporting round (NPWS 2007). Table to assess 6230 parameters Parameter Actual Status Future trend Future status Prospects Range =FRV =stable =FRV Good Area <FRV -declining <FRV Bad S&F <FRV =stable <FRV Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Based on the findings of this assessment and the assessment of 6230 that took place in the previous reporting period (NPWS 2007) the future prospects for this habitat are probably declining and will continue to decline until issues such as afforestation are controlled.

Field label	Note
Habitat code: 6230	
2.8.05 Overall assessment of Conservation Status	The Annex I habitat 6230 is not at FCS. The reasons for this are that the current area, and structure and functions of the 6230 habitat are below the FRVs. It should be noted that the current range reported here is much smaller than the figures reported in 2006, with the 6230 range decreasing from 17,800 km2 to 11,700 km2. This decrease in range is due to improved knowledge arising from the NPWS undertaking surveys for the habitat between 2007 and 2012. The figure reported in 2006 was an estimate. The current range for the 6230 habitat is stable, but as reported in 2.8.2 b the area is probably declining. The structure and functions that are necessary for the long-term maintenance of the habitat are below the FRV. Currently the FRV for structure and functions has been set nationally which assists habitat identification on a national scale but fails to take account of all the regional and local variation within the habitat. It is expected that as the monitoring programme for 6230 is developed and our understanding of the local variability within the structure and functions of the 6230 habitat increases the FRV for structure and functions will be set at a local or site specific level. If this more localised approach is taken it would be expected that over time a larger proportion of sites would attain Favourable status for structure and functions. As area and structure and functions were assessed as Bad the overall assessment of conservation status is Bad, the overall assessment for the habitat was also Bad in 2007 (NPWS 2007).
2.8.06 Overall trend in Conservation Status	Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and it would be expected that initiatives such as this should continue to have a positive influence on the overall trend of the conservation status of 6230. However, until the problem of afforestation within the 6230 habitat is dealt with the overall trend is declining in line with the declining future prospects listed in 2.8.4 b.
3.1.01 a) Surface area - Minimum	The area of 6230 habitat within Natura 2000 sites is a minimum known area, with only areas that have evidence for the presence of the Annex I habitat mapped. There are no inconsistencies listed with all SACs with 6230 listed as a Qualifying Interest overlapping with the 6230 10k distribution.
3.1.01 b) Surface area - Maximum	It is unknown what the maximum is and therefore a nominal figure equal to the minimum has been entered.
3.1.03 Trend of surface area within the network	The trend for 6230 area is assessed to be declining (Section 2.8.2 b). However, as practices such as afforestation are more controlled within SACs the trend for area within the SAC network was assessed as unknown.

Habitat code: 6230

Field label	Note
3.2 Conservation measures	Within the current reporting period O'Neill et al. (in prep.) reported non-intensive grazing as a positive or neutral activity of usually high importance at 95% of the 6230 sites, sheep were the most frequent grazer reported. A significant proportion of the 6230 habitat is located within SACs, which together with the legal protection of the Annex I habitat should maintain the conservation status. The effectiveness of protected areas and the legal protection provided to the 6230 habitat have yet to be evaluated. The 6230 habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Also Environmental Impact Assessment (EIA) by regulatory authorities protects the habitat from damage. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha. Also all applications for afforestation occurring within designated sites are referred to NPWS. Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place. Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands, such as the 6230 habitat, during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation. In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-

Species-rich *Nardus* grassland (6230) Article 17 Assessment 2013



- Current Distribution (74 cells)
- Current Range (117 cells)
- Favourable Reference Range (117 cells)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta

Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
10-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6410

NAME: Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1990-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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Rodwell, J.S. (ed.) (1991) British plant communities Volume 2: Mires and heaths. Cambridge Community Press, Cambridge.

Weekes, L.C. (1990) A vegetation survey of Glenveagh National Park and the An Taisce property, Co. Donegal. Report to the Office of Public Work, National Parks and Monuments Branch, Dublin, Ireland.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	19600	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	19600
	operator	N/A
	unknown	No
	method	The FRR was calculated on a 10 km square basis and is the same as the Range (2.3.1). As there has not been a recent comprehensive national survey of fen habitats it is expected that there may be some data gaps within the FRR as presented. The FRR for the 6410 habitat is probably sufficient for it to obtain FCS.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	5.64		
2.4.2 Year or period	1990-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	1999-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		

2.4.8 Long-term trend period	1959-2012		
2.4.9 Long-term trend direction	decrease (-)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		

2.4.12 Favourable reference area	area (km)	
	operator	much more than (>>)
	unknown	No
	method	The FRA is expected to be larger than the surface area reported in 2.4.1. Across much of its' range the 6410 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6410 habitat's typical species, including both plants and animals.

2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
abandonment / lack of mowing (A03.03)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
species composition change (succession) (K02.01)	high importance (H)	N/A
forest planting on open ground (B01)	low importance (L)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
problematic native species (I02)	medium importance (M)	N/A
agricultural intensification (A02.01)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
intensive horse grazing (A04.01.03)	medium importance (M)	N/A
Fertilisation (A08)	low importance (L)	N/A
accumulation of organic material (K02.02)	medium importance (M)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Threat	ranking	pollution qualifier(s)
abandonment / lack of mowing (A03.03)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
species composition change (succession) (K02.01)	high importance (H)	N/A
forest planting on open ground (B01)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
problematic native species (I02)	medium importance (M)	N/A
agricultural intensification (A02.01)	low importance (L)	N/A
intensive cattle grazing (A04.01.01)	medium importance (M)	N/A
intensive horse grazing (A04.01.03)	medium importance (M)	N/A
Fertilisation (A08)	low importance (L)	N/A
accumulation of organic material (K02.02)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Cirsium dissectum
Crepis paludosa
Galium uliginosum
Juncus conglomeratus
Lotus pedunculatus
Luzula multiflora
Molinia caerulea
Ophioglossum vulgatum
Potentilla anglica
Potentilla erecta
Viola palustris
Viola persicifolia
Achillea ptarmica
Carex echinata
Carex flacca
Carex nigra
Carex panicea
Carex pulicaris
Carex viridula
Equisetum palustre
Filipendula ulmaria

Galium palustre
Juncus acutiflorus
Juncus articulatus
Mentha aquatica
Ranunculus flammula
Succisa pratensis
Carum verticillatum
Lathyrus palustris

2.7.2 Species method used	Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of one high quality species (usually species that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures) to pass the typical species component of the structure and functions assessment. The high quality species are Cirsium dissectum, Carum verticillatum, Crepis paludosa, Lathyrus palustris, Galium uliginosum, Juncus conglomeratus, Carex pulicaris, Ophioglossum vulgatum, Viola persicifolia and all orchid species. The typical species list for this habitat includes species that are characteristic, indicative, or common within the 6410 habitat in Ireland. In 2013 the list of typical species was reviewed based on the data collected during the ISGS. As noted in O'Neill et al. (in prep.) the6410 habitat in Ireland is almost always represented by the Cirsium dissectum – Potentilla erecta plant community. The list of typical species differs slightly from the one applied during the last reporting period (NPWS 2007), with the current list based on an extensive survey of 113 6410 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full account of the data presented in EU Commission Interpretation Manual (2007).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	See O'Neill et al. (in prep.) for a full list of the structure and functions criteria assessed. Features of the field and ground layers were assessed, including minimum/maximum thresholds for % cover within a 2m x 2m standardised plot. Criteria such as the cover of negative indicator species were also assessed. All assessment stops that failed structure and functions were checked to examine the reason for failure. When stops had only failed on one or two criteria the reasons for the stops failing were ascertained and expert judgement was applied to decide if the overall structure and functions was passable. After applying these criteria 42% of all ISGS assessment stops and 21% of ISGS sites had a Favourable assessment for structure and functions. When the area of each 6410 site was taken into account, 15% of the assessed area had Favourable structure and functions and 78% was Bad. The total area of habitat within SACs where it isa Qualifying Interest =1.54 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1.97	max	1.97
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative Contractual Recurrent	high importance (H)	Both	Enhance
Establish protected areas/sites (6.1)	Legal	high importance (H)	Both	Enhance

Field label	Note
Habitat code: 6410	
0.2 Habitat code	The Annex I habitat 6410 is represented in Ireland by both fen and grassland communities on nutrient poor soils. The 6410 habitat is either managed as traditional hay meadows (cut only once a year in late summer or autumn with the hay crop removed) or more usually by 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 that follows the distribution of Cirsium dissectum, one of the key indicator species for the habitat. The Annex I habitat is very rare in the east of the country with only one site recorded within the five eastern counties that border the Irish Sea. The 6410 habitat is comprised of a few distinct communities belonging to the Junco-Molinion. These communities can be classified within the Cirsium dissectum – Potentilla erecta (O'Neill et al. in prep.), the Carex panicea – Festuca rubra community (Heery 1991) and M24: Molinia caerulea – Cirsium dissectum fen meadow (Rodwell 1991).
1.1.02 Method used - map	Field surveys carried out between 2007 and 2012 for the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) provide the majority of the data on which the assessment of 6410 is based. Heery & Keane (1999) was an important data source for the Shannon Callows and Browne et al. (2002) also provided data for this area. These recent data sources, plus one 6410 site from Barron & Perrin (2011) and Anon. (2008) were utilised for the current distribution of 6410. A fen database was provided by the National Biodiversity Data Centre and these relevés were analysed with the 6410 structure and functions criteria utilised by O'Neill et al. (in prep.). 51 of these relevés between 1959 and 2005 were shown to represent the 6410 Annex I habitat. The grid reference listed with each relevé was utilised when plotting their location data. Only the data sources recorded from 1990 onwards were utilised for the current distribution of 6410. Grassland relevés collected by Austin O'Sullivan between 1962 and 1982 were also analysed against the 6410 structure and functions criteria utilised by O'Neill et al. (in prep.) and 20 of the relevés were considered to represent the 6410 habitat. These releves were used to inform the long term trends. Data available in Natura 2000 forms and associated documents (NPWS data sources), such as Weekes (1990) provided the remaining data on which the national assessment of the 6410 habitat was based. As there has not been a recent comprehensive national survey of fen habitats it is expected that there are data gaps within the current 6410 distribution.
1.1.03 Year or period	Most of the data on which the assessment was based was collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.). The data in Heery & Keane (1999) was collected in 1999. The dates on which data were collected for the Natura 2000 forms varies, but the data that were utilised during the writing of this report were collected between 1995 and 2000. The earliest sources used to derive the current distribution were collected in 1990. The survey dates and references for all datasets are provided in the associated GIS files.

Field label	Note
Habitat code: 6410	
2.2 Published sources	O'Neill et al. (in prep.) defines the assessment criteria for 6410 that were applied when writing this conservation assessment. The Irish Semi-natural Grasslands Survey (data collected from 2007 to 2012) provided the data for this publication and the survey sampled all areas of the State where the Annex I habitat 6410 is thought to occur. Heery & Keane (1999) provided data that was utilised in the production of this conservation assessment. The majority of the areas visited by Heery & Keane (1999) were revisited during the Irish Semi-natural Grasslands Survey (ISGS). During the writing of this report the two datasets were analysed and any changes observed between Heery & Keane (1999) and the ISGS dataset were either attributed to slight differences between the two studies in the interpretation of what constituted the Annex I habitat, or differences in the areas chosen for survey. Browne et al. (2002), Barron & Perrin (2011) and Anon. (2008) each include an area of 6410 that has been mapped over an aerial photograph base map. The species lists for these sites included many of the indicator species for the 6410 habitat. Maher (in prep.) is a study of floodplain meadows in Ireland, the study provided no additional location data but did contribute information on the management of the 6410 habitat. The data utilised from the Natura 2000 forms and associated NPWS documents included location data and lists of the vascular plant species that were found in these locations. A fen database was provided by the National Biodiversity Data Centre (NBDC) and these relevés were analysed using the 6410 structure and functions criteria utilised by O'Neill et al. (in prep.). 51 of these relevés recorded between 1959 and 2005 were shown to represent the 6410 Annex I habitat. The grid reference listed with each relevé was utilised when plotting their location data. Grassland relevés collected by Austin O'Sullivan between 1962 and 1982 (Bourke et al. 2007) were also analysed against the 6410 structure and functions criteria utilised by O'Neill et al. (in prep.) and 20 of the relevés were considered to represent the 6410 habitat. Where possible the location of these relevés were mapped.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	The majority of data on which the calculation of the range was based was collected between 2007 and 2012 during the ISGS (O'Neill et al. in prep.). As stated in Section 1.1.2 Heery & Keane (1999) was an important data source for the Shannon Callows and Browne et al. (2002) also provided data for this area that was utilised when calculating range. Data from Barron & Perrin (2011) and Anon. (2008) each contributed one site to the current range. The fen dataset provided by NBDC (National Biodiversity Data Centre) shows that the ISGS data alone would lead to an underestimate for the range of this Annex I habitat, particularly in counties Clare, Kildare, Mayo and Westmeath. This was to be expected as the ISGS data were collected in grassland habitats rather than fens. The decision was taken only to use datasets collected from 1990 onwards to inform the current range of the 6410 habitat. However, the range was extended by two 10 km squares in the Burren region based on a cluster of historic fen meadow sites (Ivimey-Cook & Proctor 1966) that are thought to still contain the 6410 habitat. As there has not been a recent comprehensive national survey of fen habitats it is expected that there are data gaps within the 6410 range.
2.3.03 Short-term trend - Period	The default trend period was used.

Field label	Note
Habitat code: 6410	
2.3.04 Short term trend - Trend direction	There is some evidence that the climatic factors that contribute to the range of this Annex I habitat have changed in the last 12 years (Leahy & Kiely 2011; Maher in prep.). Both these publications highlight the problems of increased flooding events, with Maher (in prep.) discussing how this can lead to farmers altering traditional management regimes and subsequent changes in plant communities. Although it is expected that the effects reported by Maher (in prep.) are having some short-term effect on the area of 6410 habitat no evidence was found for any short-term effect on the range of the habitat. The ISGS found evidence of some recent losses in the 6410 habitat area but none of these have impacted on the range of the habitat. It should be noted that the method used to calculate the range has changed since the 2007 reporting period, due to the use of the range tool. Also for the 6410 habitat a more comprehensive dataset has been collected since 2007 (O'Neill et al. in prep.) resulting in improved understanding and definition for the habitat in Ireland and a more accurate distribution map on which to base the range.
2.3.06 Long-term trend - Period	The long-term trend period is best described from 1959 to 2012 as this is the period the main datasets cover.
2.3.07 Long-term trend - Trend direction	Comparing the geographical range of the 6410 sites recorded by Austin O'Sullivan between 1962 and 1982 (Bourke et al. 2007) and the ISGS between 2007 and 2012 there does not appear to have been a significant decrease in the range of this Annex I habitat. The older fen datasets recorded between 1959 and 1989 were not included when assessing the long-term trend direction as there are no comparable recent fen datasets.
2.3.09 b) Favourable reference range - Indicate if operators were used	The FRR was calculated on a 10 km square basis and is the same as the Range (2.3.1). As there has not been a recent comprehensive national survey of fen habitats it is expected that there may be some data gaps within the FRR as presented. The FRR for the 6410 habitat is nevertheless assumed to be sufficient for it to obtain FCS.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The range calculated for the 2001-2006 reporting period (NPWS 2007) was estimated based on incomplete survey. Range calculated for the current reporting period is based on an almost complete nationwide survey of the habitat. The reported range of the Annex I habitat has decreased significantly due to an over-estimation of the range of the 6410 habitat in the last reporting period (NPWS 2007). However it should be noted that there may be gaps where the habitat occurs in fens.
2.3.10 c) Reason for change - use of different method	The Range tool was employed to derive range rather than manual method used in 2007.

Field label	Note
Habitat code: 6410	
2.4.01 Surface area	Surface area is primarily based on the 6410 mapping carried out by O'Neill et al. (in prep.), the ISGS 2007-2012 provided the data for this publication and surveyed many of the areas where the Annex I habitat 6410 is thought to occur. Heery & Keane (1999) provided additional data for the Shannon Callows that was utilised when mapping the area of 6410. Many of the areas that were mapped in 1999 were revisited between 2007 and 2012 by the ISGS. Although there were some differences in the interpretation of the 6410 habitat between the two projects generally the areas of 6410 mapped by the two surveys tally well. Heery was the first ecologist to study the Molinia meadows (6410) of the Shannon Callows and has expert knowledge of the subject. Data from Barron & Perrin (2011), Anon. (2008) and Browne et al. (2002) each contributed one site to the current area. As stated in Section 2.3.2 the fen dataset provided by NBDC shows that the ISGS data alone would lead to an underestimate for the range and area of the 6410 habitat within the State. The six 6410 fen relevés from the NBDC dataset that were recorded from 1990 onwards were included when calculating the current area. The data utilised from the Natura 2000 forms and associated documents (NPWS data sources) provided eight additional areas of the 6410 habitat within SACs 002032, 002034, and 002074. Due to the fact that the 6410 relevés recorded by O'Sullivan are all over 30 years old these data were not included within the 6410 surface area reported here. The reported surface area of 5.64 km2 is much lower than the area of 200 km2 reported for the previous period (2001 to 2006). The reason for the decrease in area is due to the current report being based on an almost complete national dataset (O'Neill et al. in prep.). It should be noted that the Shannon Callows is a very important region within Ireland for the 6410 habitat accounting for 18% (1.03 km2) of the habitat nationally. The surface area for 6410 reported is probably a significant underestimation of the total area of the habitat in Ireland.
2.4.02 Year or period	Most of the data on which the assessment was based were collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.). The earliest sources used to derive the surface area were collected in 1990. The survey dates and references for all datasets are provided in the associated GIS files.
2.4.04 Short-term trend - Period	As the Heery & Keane (1999) data collected in 1999 was also utilised when calculating short-term trend the period has been extended to 1999.
2.4.05 Short-term trend - Trend direction	For each of the 113 ISGS sites containing 6410 the area of the Annex I habitat mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep.). Of the 113 6410 sites that were surveyed a loss in area of 1 ha was observed across eight sites, mainly due to succession from grassland to scrub. Four of the 113 sites showed an increase in the area of 6410 of 1 ha, mainly due to scrub clearance. These data indicate that over the last 12 years the area of 6410 within the State has remained stable. Often the changes that are contributing to a decline in the area of 6410, for example abandoned meadows or pasture, or fertiliser application and reseeding, are very difficult to observe without a long-term monitoring scheme. Therefore any observed differences using aerial photographs are an under representation of the true nature of the change.

Field label	Note
Habitat code: 6410	
2.4.07 Short-term trend - Method used	Short-term trend direction is based on the 113 ISGS sites containing 6410 that were surveyed between 2007 and 2012 (O'Neill et al. in prep.). For each of these sites the area of 6410 mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep.). Due to the difficulties in observing more subtle changes in the nature of grassland, such as fertiliser application, any observed differences are probably an under representation of the true nature of the change.
2.4.08 Long-term trend - Period	The long-term trend period is best described from 1959 to 2012 as this is the period of time the datasets cover.
2.4.09 Long-term trend - Trend direction	Although the range of 6410 appears to have remained stable over the last 50 years it is difficult to imagine that the changes that have taken place in Irish agriculture and forestry during this period would not have impacted negatively on the 6410 habitat. Therefore it is expected that the area of 6410 has declined in the long-term.
2.4.12 b) Favourable reference area - Indicate if operators were used	The FRA is expected to be larger than the surface area reported in 2.4.1. Across much of its' range the 6410 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6410 habitat's typical species, including both plants and animals.
2.4.13 a) Reason for change - genuine change?	The ISGS data collected between 2007 and 2012 have shown than there has been little change in the area of this Annex I habitat (section 2.4.5) during the reporting period.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The reported surface area for 6410 of 5.64 km2 is much lower than the area of 200 km2 reported for the previous period (2001 to 2006). The reason for the decrease in area is due to the current report being based on a complete dataset (O'Neill et al. in prep.), the figure in the 2006 report was an estimate.
2.5 Main pressures	The pressures listed are based on data presented in O'Neill et al. (in prep.). The Sites Inspection Reports (SIR) of NPWS rangers was also consulted but the one reported impact for 6410 did not seem relevant.

Field label	Note
Habitat code: 6410	
2.5.01 Method used - pressures	Based on the data in O'Neill et al. (in prep.) succession to scrub, abandonment of pastoral systems, and abandonment of mowing are the three most frequently reported pressures on the 6410 habitat. Due to the fact that the more detailed updated activity codes were utilised from 2010, the frequency data presented is based on the 73 6410 sites surveyed from 2010 to 2012. Succession was recorded at 18% of 6410 sites at a medium intensity, abandonment of pastoral systems and mowing were recorded at 18% and 16% of sites respectively and both at a high intensity. Due to their high occurrence within the 6410 habitat each of these were recorded as pressures of high importance nationally. The impacts of agricultural intensification and fertilisation were recorded at a minimal number of sites but this was probably due to the fact that it can be difficult to observe these impacts actually taking place during one field visit. 12% of sites had some type of forestry impact recorded within the Annex I habitat or immediately adjacent. One-off impacts such as planting forestry on open ground are rarely observed during one field visit and it would be expected that the importance of forestry pressures on the 6410 habitat have been underestimated based on the ISGS data. Drainage ditches were both a negative and positive pressure on the 6410 habitat. If drainage ditches were too large or numerous the habitat was too dry for the 6410 community, but conversely in many situations if the drains were not properly maintained; sometimes recorded under the impact 'accumulation of organic material', the habitat was too waterlogged. The problem of poorly maintained drains is having a negative impact on some areas of 6410 habitat within the Shannon Callows. The previous conservation assessment for this habitat (NPWS 2007) listed a subset of the pressures listed in this report.
2.6 Main threats	The threats listed are based on the pressures from section 2.5 a. It is considered that each of the pressures noted in 2.5 a are common impacts that will continue to have a negative effect on the conservation status of the 6410 habitat over future reporting periods (specifically the next 12 years).
2.7.02 Typical species - method used	Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of one high quality species (usually species that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures) to pass the typical species component of the structure and functions assessment. The high quality species are Cirsium dissectum, Carum verticillatum, Crepis paludosa, Lathyrus palustris, Galium uliginosum, Juncus conglomeratus, Carex pulicaris, Ophioglossum vulgatum, Viola persicifolia and all orchid species. The typical species list for this habitat includes species that are characteristic, indicative, or common within the 6410 habitat in Ireland. In 2013 the list of typical species was reviewed based on the data collected during the ISGS. As noted in O'Neill et al. (in prep.) the6410 habitat in Ireland is almost always represented by the Cirsium dissectum – Potentilla erecta plant community. The list of typical species differs slightly from the one applied during the last reporting period (NPWS 2007), with the current list based on an extensive survey of 113 6410 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full account of the data presented in EU Commission Interpretation Manual (2007).

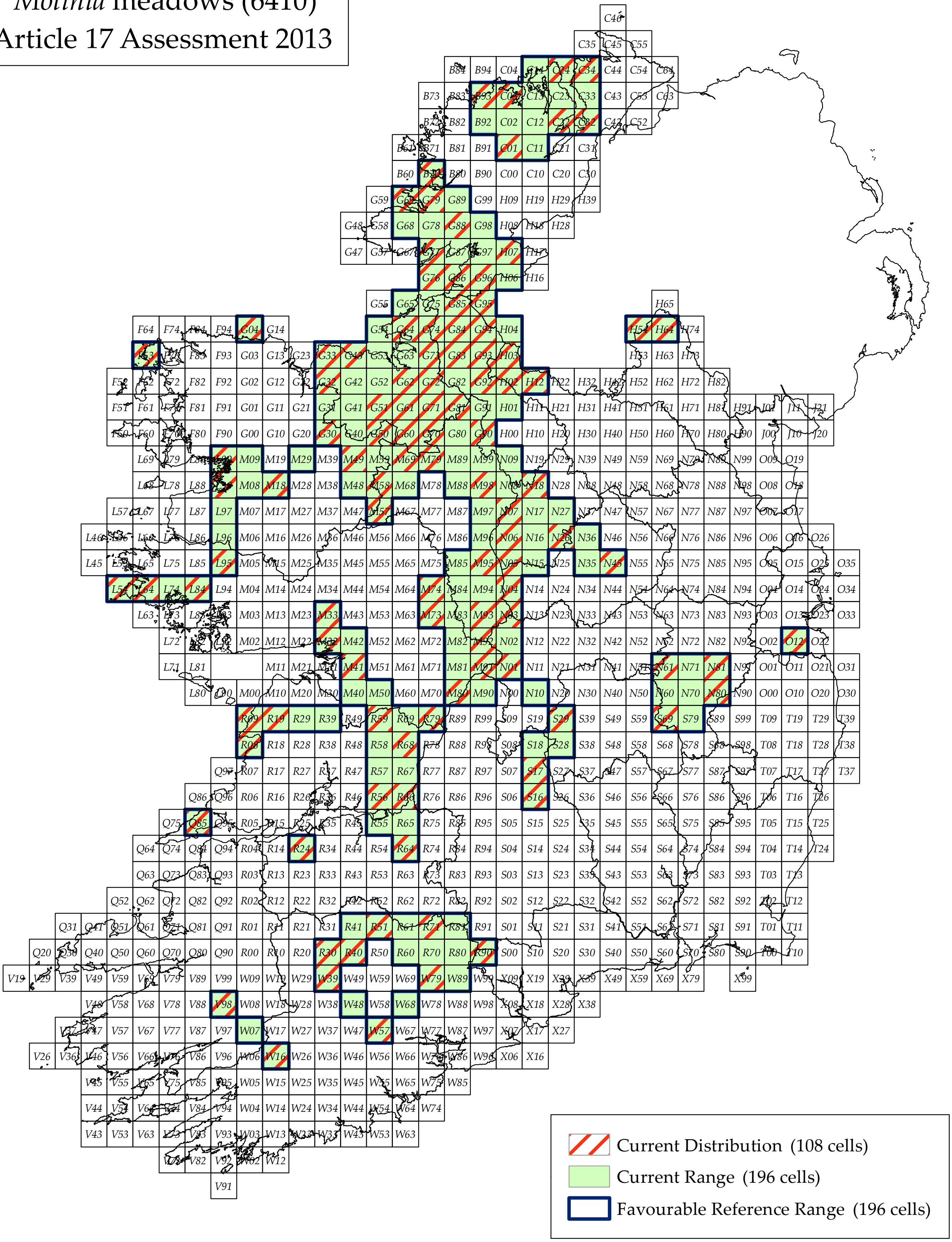
Field label	Note
Habitat code: 6410	
2.7.05 Other relevant information	See O'Neill et al. (in prep.) for a full list of the structure and functions criteria assessed. Features of the field and ground layers were assessed, including minimum/maximum thresholds for % cover within a 2m x 2m standardised plot. Criteria such as the cover of negative indicator species were also assessed. All assessment stops that failed structure and functions were checked to examine the reason for failure. When stops had only failed on one or two criteria the reasons for the stops failing were ascertained and expert judgement was applied to decide if the overall structure and functions was passable. After applying these criteria 42% of all ISGS assessment stops and 21% of ISGS sites had a Favourable assessment for structure and functions. When the area of each 6410 site was taken into account, 15% of the assessed area had Favourable structure and functions and 78% was Bad. Other relevant information on the area of the 6410 habitat within the State are: Total area of point data within SACs =4 m2 Total area of polygon data within SACs =1.97 km2 Total area of habitat within SACs =1.97 km2 Total area of point data outside SACs =28 m2 Total area of polygon data outside SACs =3.68 km2 Total area of habitat outside SACs =3.68 km2 Total area of point data within SACs where it is a QI =0 m2 Total area of polygon data within SACs where it is a QI =1.54 km2 Total area of habitat within SACs where it is a QI =1.54 km2 Total area of point data within SACs where it is not a QI =4 m2 Total area of polygon data within SACs where it is not a QI =0.43 km2 Total area of habitat within SACs where it is not a QI=0.43 km2
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Over the short-term the range of the 6410 habitat is stable. The data seems to indicate that the current range is very similar to the FRR (section 2.3.7) and for this reason the FRR is set at the current range and the overall assessment for range is Favourable.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	There is no evidence from the ISGS dataset that overall range has declined significantly during the last reporting period and it is considered to be stable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The data presented in Section 2.4.5 shows that the 6410 area has remained stable over the last 12 years (from comparing areas mapped during the ISGS with areas visible on aerial photos taken in 2000).However, the vulnerability of the 6410 habitat to the afforestation and agricultural improvements that have taken place over the last 50 years, and also to the abandonment of marginal lands that have probably occurred more recently, leads to the conclusion that the current area of 6410 must be significantly less than the FRA. For this reason area is assessed as Bad.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The area is considered to be stable within the current reporting period and therefore the qualifier for area is stable. However, the problems of afforestation and abandonment must be tackled to prevent further losses in area.

Field label	Note
Habitat code: 6410	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The 113 6410 grassland sites monitored between 2007 and 2012 (O'Neill et al. in prep.) were used as a proxy for the national resource of this Annex I habitat. When deciding on the thresholds used to assess the national status of structure and functions, the following criteria were applied. If >99% of the assessed area within Ireland has a Favourable status, then structure and functions are Favourable nationally. If >=25% of the assessed area has a status of Bad, then structure and functions are Bad nationally. Any other situation results in a national assessment of Inadequate. As 15% of the area of 6410 assessed during the current reporting period had a Favourable structure and functions the national assessment for 6410 is Bad. Individually two of the criteria used to assess the structure and functions of stops had a low pass rate with litter cover only having a pass rate of 67% and forb component a pass rate of 60%. Both these criteria indicate the poor structure of many Molinia meadows which is often a direct result of a lack of management. The pass rate for the typical species criteria was also quite low, at 84%, and In the future there is definitely an argument for expanding the range of typical species and for ecologists to propose more specific typical species lists that assess the structure and functions of a particular site or region. It would also be expected that in the future fauna, as well as flora, would be utilised when assessing sites. However, to assist ecologists in the identification of the 6410 habitat a list of typical species that are particularly characteristic, indicative, or common for the habitat in Ireland has been proposed.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structure and functions is considered to be declining. This is based on the fact that the data collected during the ISGS has shown that the two threats of 'abandonment/lack of mowing' and 'abandonment of pastoral systems, lack of grazing' are of such high importance. It would be expected that the structure and functions of the 6410 habitat will continue to decline until these threats are significantly reduced.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters is Bad and considered to remain Bad for the foreseeable future (12 years) the future prospects is assessed as Bad. An assessment of Bad was made for the last reporting round (NPWS 2007) and the habitat continues to decline as shown by the declining trend for structure and functions. Table to assess 6410 parameters Parameter Actual Status Future trend Future status Prospects Range =FRV =stable =FRV Good Area <FRV =stable <FRV Bad S&F <FRV -declining <FRV Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Based on the findings of this assessment and the assessment of 6410 that took place in the previous reporting period the future prospects for this habitat are probably declining as structure and functions are continuing to decline.

Field label	Note
Habitat code: 6410	
2.8.05 Overall assessment of Conservation Status	The Annex I habitat 6410 is not at FCS. The reasons for this are that the area and structure and functions of the 6410 habitat are below the FRVs. It should be noted that the area and current range reported here are much smaller than the figures reported in 2006, with the 6410 area decreasing from 200 km2 to 5.64 km2. This decrease in area is due to the NPWS undertaking a national survey for the habitat (in a grassland context) between 2007 and 2012. The figure reported in 2006 was an estimate. The current range of the 6410 habitat is stable over the recent past and there is little evidence, from the ISGS data, that the area of the habitat continues to decline. The structure and functions that are necessary for the long-term maintenance of the habitat are below the FRV. Currently the FRV for structure and functions has been set nationally which assists habitat identification on a national scale but fails to take account of all the regional and local variation within the habitat. It is expected that as the monitoring programme for 6410 is developed and our understanding of the habitat increases the FRV for structure and functions will be set at a local or site specific level. If this approach is taken it would be expected that a larger proportion of sites would attain favourable status for structure and functions.
2.8.06 Overall trend in Conservation Status	The 6410 habitat is almost always associated with marginal farm land on nutrient poor soils and is therefore probably more threatened by the abandonment of these areas and subsequent succession, or the planting of forestry, than by agricultural improvement. It is expected that agri-environment schemes could improve the management of the 6410 habitat within the State and reverse these negative trends. As there is currently no evidence that this is happening and structure and functions continue to decline and the overall trend in conservation status is declining.
3.1.01 a) Surface area - Minimum	The area of 6410 habitat within Natura 2000 sites is a minimum known area, with only areas that have evidence for the presence of the Annex I habitat mapped. Of the SACs that have 6410 listed as a Qualifying Interest, the Annex I habitat has been recorded and mapped in all of these except for 002070. No credible evidence could be found for the presence of the 6410 habitat within SAC 002070.
3.1.01 b) Surface area - Maximum	It is unknown what the maximum is and therefore a nominal figure equal to the minimum has been entered.
3.1.03 Trend of surface area within the network	As the trend for 6410 area (Section 2.4.5) is assessed to be stable, the trend for area within the SAC network was also assessed as stable.

Field label	Note
Habitat code: 6410	
3.2 Conservation measures	Within the current reporting period O'Neill et al. (in prep.) reported non-intensive grazing as a positive or neutral activity at 75% of the 6410 sites, cattle were the most frequent grazer reported. Non-intensive mowing was reported at 15% of sites surveyed and it was usually recorded in combination with non-intensive grazing. A significant proportion of the 6410 habitat is located within SACs which together with the legal protection of the Annex I habitat should maintain the conservation status. The effectiveness of protected areas and the legal protection provided to the 6410 habitat have yet to be evaluated. A small proportion of 6410 sites include protected species such as Marsh Fritillary (Euphydryas aurinia) that could enhance the conservation status of a site. The 6410 habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Also Environmental Impact Assessment (EIA) by regulatory authorities protects the habitat from damage. The 6410 habitat is also protected by the fact that applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation.

Molinia meadows (6410)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
07-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6430

NAME: Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Anon. (2012) Limerick northern distributor road supplementary constraints information. Draft report prepared by Roughan & O'Donovan Consulting Engineers for Clare County Council.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

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Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Hickey, B. & Tubridy, M. (2009) Habitats Survey (Phase V) County Laois. Unpublished report by Mary Tubridy and Associates for Laois Heritage Forum.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

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NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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(2009) Irish Semi-natural Grasslands Survey - Annual Report No. 2: Counties Cavan, Leitrim, Longford and Monagahan. Unpublished report to National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

O'Neill, F.H., Martin, J.R., Devaney, F.M., McNutt, K.E., Perrin, P.M. & Delaney, A. (2010) Irish Semi-natural Grasslands Survey Annual Report No. 3: Counties Donegal, Dublin, Kildare & Sligo. Report submitted to National Parks & Wildlife Service, Dublin.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. 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. 10: Ox Mountains Bogs cSAC (002006), Cos. Mayo and Sligo. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013e). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.

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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.

Wilmanns, O. & Brun-Hool J. (1982) Irish mantel and saum vegetation. Journal of Life Sciences of the Royal Dublin Society, 3, 165-174.

Wilson, F. (2009) County Sligo wetland survey phase II County Report. Unpublished report for Sligo County Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	16300	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	16300
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.8		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	unknown (x)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Absent data (0)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	
	operator	more than (>)
	unknown	No
	method	It is unknown if the area of this habitat has declined since the Directive came into force in 1994. However, the very small patch size and fragmented nature of the lowland community suggest that an enlarged area is necessary for either typical species to reach favourable conservation status or for the necessary structures and functions to exist.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
grazing (A04)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	Mixed pollutants (X)
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
grazing (A04)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	Mixed pollutants (X)
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Alchemilla spp.
Alisma lanceolatum
Alisma plantago-aquatica
Angelica sylvestris
Calystegia sepium
Cicuta virosa
Cochlearia officinalis agg.

Crepis paludosa
Epilobium hirsutum
Epilobium palustre
Epilobium parviflorum
Equisetum fluviatile
Equisetum palustre
Eupatorium cannabinum
Filipendula ulmaria
Galium palustre
Geum rivale
Heracleum sphondylium
Hieracium spp.
Hypericum spp.
Hypericum tetrapterum
Iris pseudacorus
Lysimachia vulgaris
Lythrum salicaria
Mentha aquatica
Myosotis scorpioides
Oxyria digyna
Persicaria amphibia
Primula vulgaris
Ranunculus acris
Rumex acetosa
Rumex hydrolapathum
Sedum rosea
Sium latifolium
Solidago virgaurea
Solanum dulcamara
Stachys palustris
Succisa pratensis
Symphytum officinale
Thalictrum minus
Trollius europaeus
Valeriana officinalis
Viola riviniana

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the ISGS. Whilst the upland community was mapped and relevés from it were recorded by the NSUH, the habitat was not assessed. Assessments were therefore made retrospectively using the available relevé

	data. At each ISGS monitoring stop a minimum of three typical species and a minimum cover of typical species of 40% were required. At each NSUH relevé a minimum of one typical species was required and at least 25% of the vascular vegetation cover needed to comprise typical species. As these were baselines surveys, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The area of habitat within SAC network that is a Quaifying Interest = 0.06 km2 This report does not include any mapping or assessment of woodland fringe or 'saum' communities in Ireland that may be ascribable to this Annex I habitat. Further investigation is required to define this habitat in that context and to map and assess the relevant examples. Further work is also needed to comprehensively map the riparian community. Whilst it had been hoped that the ISGS would accomplish this, a river-focussed project may have more success it locating the habitat.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	unknown (x)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.47	max	0.47
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Administrative	high importance (H)	Both	
No measure known/ impossible to carry out specific measures (1.3)	Administrative	medium importance (M)	Both	

Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 6430	
0.2 Habitat code	Three distinct communities can be considered for this habitat in Ireland: i) In the lowlands, the habitat occurs as a community of watercourses, particularly unmanaged edges of slow-moving rivers and the margins of lakes. Nutrient levels may be naturally high. The community is dominated by tall hydrophilous herbs, for example Angelica sylvestris, Filipendula ulmaria, Iris pseudacorus, Lysimachia vulgaris, Lythrum salicaria and Valeriana officinalis. Horsetails such as Equisetum fluviatile and E. palustre are a common feature, but monospecific stands of horsetails should not be included. Reed beds, large sedge swamps, large areas of fallow wet meadow and neophyte communities (e.g. with Impatiens glandulifera) are also not included. This community largely falls within the Filipendulion alliance which is listed under this habitat in the Interpretation Manual (European Commission 2007). ii) In the uplands, the habitat occurs as a community of ungrazed or lightly grazed cliff ledges. These occur on calcareous cliffs and on wet siliceous cliffs where there is some base-enrichment from the water. Individual patches of the community are typically small (<1 m across). Floristically, there may be some overlap with communities of habitats 8210 and 8220, but in this community hydrophilous herbs are characteristic rather than ferns. Such species include Alchemilla spp., Angelica sylvestris, Crepis paludosa, Filipendula ulmaria, Geum rivale and Thalictrum minus. Luzula sylvatica may be present but ledges strongly dominated this species are not included. This community corresponds with the U17 Luzula sylvatica-Geum rivale tall herb community of the British NVC which is listed under this habitat in the Interpretation Manual (European Commission 2007). iii) In the lowlands, the habitat also possibly occurs as a nitrophilous tall herb community of woodland borders, referred to as a saum community. This habitat has been little studied in Ireland (see Wilmanns & Brun-Hool 1982) but typical species are likely to include Alliaria petiolata, Anthriscus sylvestris, Eupatorium cannabinum, Geranium robertianum, Geum urbanum, Petasites hybridus and Vicia sepium. Archaeophytes such as Artemisia vulgaris and Lamium album may occur. Whilst Urtica dioica and Aegopodium podagraria may occur, species-poor stands dominated by these species should probably not be included. This community would fall within the Glechoma hederaceae order which is listed under this habitat in the Interpretation Manual (European Commission 2007). Only the first of these three communities was recognised in the report for the 2000-2006 reporting period (NPWS 2007). The second community has been recorded during the NSUH and is included in the present assessment for 2007-2012. The third community is not included in the present assessment. Further investigation and discussion is required to determine if Ireland supports examples of this community which should be considered under this habitat category
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat is scattered across most of the country with clustering of records along the Shannon, the Barrow and Nore, and in the Sligo/Leitrim area. Records in the east mainly represent the lowland community, whilst records in the west mainly represent the upland community.

Field label	Note
Habitat code: 6430	
1.1.02 Method used - map	The distribution map is 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 FS2 or GM1 in their attributes. Available data sources were reviewed and data were extracted from the following sources: Carlow Pilot Habitat Mapping Project. GIS files for this Carlow County Council habitat survey were available. Cavan habitat map. A Cavan County Council habitat survey (Kearney 2010). Habitat information is derived from aerial photographic interpretation with targeted field surveys. Clare survey of vulnerable landscapes. GIS files for this Clare County Council habitat survey were available. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. Fingal habitat survey. GIS files for this project were made available by Fingal County Council. Irish Semi-natural Grassland Survey. An NPWS project mapping semi-natural grassland sites and assessing the conservation status of Annex I grassland habitats (Martin et al. 2007, 2008, O'Neill et al. 2009, 2010). Both polygons and relevés of the lowland form of this habitat are recorded. Laois Habitat Survey. A Laois Heritage Forum habitat survey (Hickey & Tubridy 2009). Habitat information is based on field surveys. Limerick northern distributor road. The report for this project (Anon. 2012) was available online and point locations of 6430 were derived from maps in the report. Lough Derg Habitat survey. GIS files for this project were made available by Clare County Council. Louth Wetland Survey. A Louth County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Foss et al. 2012). Sligo Wetlands Survey. A Sligo County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson 2009). South Clare Habitat Map Cratloe to Parteen. GIS files for this project were made available by Clare County Council. NPWS 2007. Nominal points for each hectad included in the previous distribution of 6430 were included. National Survey of Upland Habitats. An NPWS project mapping and assessing the

Field label	Note
	conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). The habitat has been recorded and mapped from 8 of the 13 sites which have been mapped in detail. In the survey and mapping of habitats in Co. Roscommon the GIS attributes indicated 6430 as being widespread across the county at each location where GM1 was recorded. On inspection the project report indicated the habitat was not recorded during the survey; these records were therefore omitted. There has not been a comprehensive survey of this habitat in Ireland. The NSUH is still ongoing and more examples of the upland community are likely to be found. The ISGS only recorded the lowland habitat where it occurred within or adjacent to semi-natural grassland. There are likely to be many more examples along lowland rivers that have not been mapped.
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at eight of the fourteen sites surveyed (Perrin 2011, 2012, 2013b,c,d,e,f, Roche 2012). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Wilmanns & Brun-Hool (1982) present a review of saum vegetation in Ireland. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping data is provided by the NSUH and ISGS for a limited number of sites only. It is highly likely that future fieldwork will expand the range.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	It is unlikely that there has been a decline in range since 2001, but as the current range is not based on a strong dataset, this cannot be stated with confidence.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 2,400 km2. The considerable increase in range is due to the use of an enlarged selection of datasets and surveying by the ISGS and NSUH. The change in habitat definition is also important.

Field label	Note
Habitat code: 6430	
2.3.10 c) Reason for change - use of different method	Use of the range tool has also affected the range calculation.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat. For each of the point records not intersecting within a polygon that was yielding an area, 400 m2 of habitat was estimated; this was based on expert judgement of average habitat patch size. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	At the sample of upland sites covered by the NSUH there is no apparent loss of habitat since 2001. No significant losses were detected by the ISGS sample. However, due to the proximity of the riparian community and lowland farmland it is possible that this habitat is being impacted by agricultural improvement and changes in drainage management along watercourses, especially since a firm definition of this Annex I habitat as hitherto been wanting. Due to the small size of the lowland fragments, any impact would be significant. In the absence of sufficient information on area and distribution an “x unknown” trend is applied.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 0.1 km2. More accurate knowledge of the area of habitat 6430 is available from the ISGS and NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	There is no backing document for the 2007 report and therefore no explanation of how the area of 0.1 km2 was calculated
2.5 Main pressures	Grazing, particularly by cattle, is an issue within the lowland community. Grazing by sheep is possible for more accessible examples in the uplands. Impatiens glandulifera is an aggressive invasive of riparian communities that was recorded at four ISGS sites at which habitat 6430 was recorded. Epilobium brunnescens was noted as an invasive in upland areas. Agricultural and industrial pollution of watercourse is likely to impact on this habitat. As a marginal habitat agricultural intensification and land reclamation are also deemed to be pressures. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources.
2.5.01 Method used - pressures	This habitat was mapped but not assessed by the NSUH, therefore impacts were not specifically recorded. Damaging levels of grazing and trampling were recorded by the ISGS but most of the pressures are derived from expert judgement. Little information relevant to this habitat was recorded in the NPWS Site Inspection Report database.

Field label	Note
Habitat code: 6430	
2.6 Main threats	The list of threats is the same as the list of pressures.

Habitat code: 6430

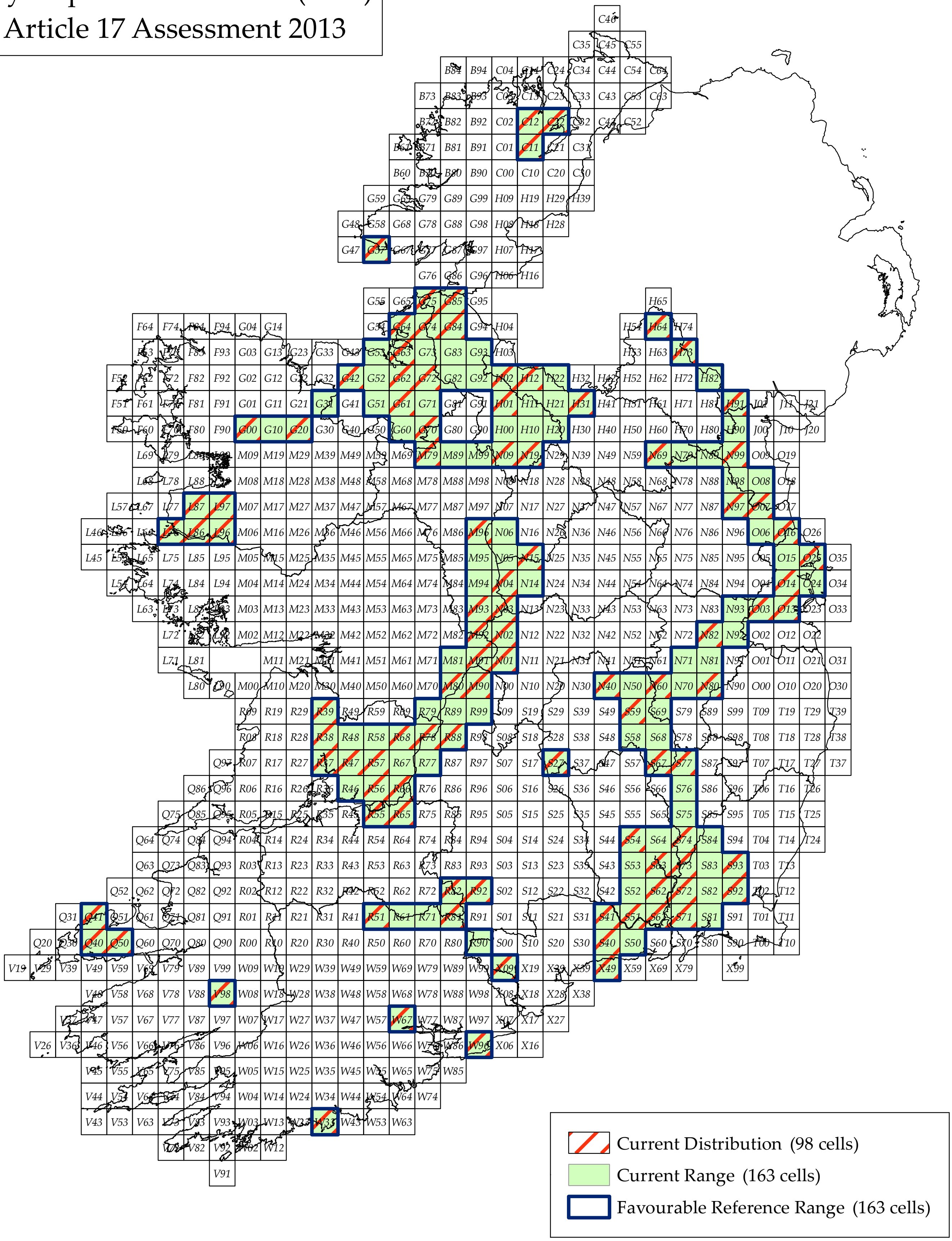
Field label	Note
2.7 Complementary information	The list of typical species combines typical species for the upland and lowland communities. The upland species are based on field observations during the NSUH, the lowland list is based on a review of relevé data from the ISGS. The two separate lists are: Lowland: Alisma lanceolatum Alisma plantago-aquatica Angelica sylvestris Calystegia sepium Cicuta virosa Crepis paludosa Epilobium hirsutum Epilobium palustre Epilobium parviflorum Equisetum fluviatile Equisetum palustre Eupatorium cannabinum Filipendula ulmaria Galium palustre Hypericum tetrapterum Iris pseudacorus Lysimachia vulgaris Lythrum salicaria Mentha aquatica Myosotis scorpioides Persicaria amphibia Rumex hydrolapathum Sium latifolium Solanum dulcamara Stachys palustris Symphytum officinale Trollius europaeus Valeriana officinalis Upland: Alchemilla spp. Angelica sylvestris Cochlearia officinalis agg. Crepis paludosa Filipendula ulmaria Geum rivale Heracleum sphondylium Hieracium spp. Hypericum spp. Oxyria digyna Primula vulgaris Ranunculus acris Rumex acetosa Sedum rosea Soildago virgaurea Succisa pratensis Thalictrum minus Valeriana officinalis

Habitat code: 6430

Field label	Note
	Viola riviniana
2.7.04 Structure and functions - Methods used	The ISGS assessed structure and functions at a monitoring stop level, using criteria to assess vegetation composition (including typical species), vegetation structure and physical structure. Criteria were adapted from the UK's JNCC Common Standards Monitoring (JNCC 2009) using expert judgement. A total of 50 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the ISGS final report. The main failures were due to low cover abundance of positive indicator species and low herb height. 1. No. of positive indicator species ≥3 (16.0%) 2. Cover of positive indicator species ≥40% (20.0%) 3. Cover of negative indicator species <33% (2.0%) 4. Cover of non-native species <1% (0.0%) 5. Cover of scrub/bracken/trees <5% (0.0%) 6. Mode herb height ≥50 cm (26.0%) 7. Cover of bare soil in relevé <10% (8.0%) For the uplands community, criteria for the structure and functions assessment were again adapted by the NSUH (Perrin et al. 2013a) from the UK's Common Standards Monitoring (JNCC 2009) using expert judgement and assessed vegetation composition (including typical species), vegetation structure and physical structure. As this was a retrospective assessment of the NSUH data, only certain criteria could be applied. A total of twenty-four relevés were recorded across all sites. The criteria used and failure rates are presented below. The main failures were due to low cover of positive indicator species and cover of the non-native species Epilobium brunnescens. 1. No. of positive indicator species ≥1 (0.0%) 2. Proportion of vegetation composed of positive indicators species ≥25% (29.2%) 3. Proportion of vegetation composed of non-native species <1% (25.0%) 4. Proportion of tall herb stems greater than 20 cm ≥50% or signs of flowering or ability to flower present (0.0%) 5. Proportion of flowering tall herb shoots grazed <50% (not assessed) 6. Cover of disturbed bare ground in relevé <25% (0.0%) 7. Cover of disturbed bare ground in local vicinity <10% (not assessed)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The highly fragmented nature of the lowland community suggests that an increase in area is needed to reach the FRV.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	There is insufficient information on area for a qualifier to be applied.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 74 monitoring stops recorded in this habitat by the NSUH and ISGS, 37 stops (50%) failed. This failure rate is over 25% and hence a U2 - Bad assessment was made. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat

Field label	Note
Habitat code: 6430	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	A qualifier of "=stable" is tentatively applied although there is no real information on trends available. Further spread of Epilobium brunnescens in the uplands is possible, but the majority of the area of the habitat is probably the lowland community. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no fieldwork was actually conducted; there is no evidence that status has actually declined since this time.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Bad prospects, future prospects is assessed as U2 - Bad. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / <FRV / x unknown / x unknown / Unknown S&F / <<FRV / =stable / <FRV / Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As none of the known parameters are improving or declining the qualifier is assessed as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U2 – Bad, the overall assessment is U2 – Bad.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate; but this was speculative and it is unclear if there has been any actual decline.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.2 Conservation measures	The majority of the estimated national resource of this habitat is likely to be within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Measures are needed to reduce the impact of grazing animals on the lowland habitat and to increase the area of the habitat if the habitat is to move towards FCS (1.2). Further investigation into the habitat is needed to see how this could best be implemented, possibly through agri-environmental schemes and/or decanalisation of rivers under Water Framework Directive. It is not known how serious the presence of Epilobium brunnescens is for the future of the upland community as little research appears to have been undertaken in a European context. No measures are being undertaken to control this species. It is also not known what the best strategy for removal of the plant would be (1.3). It is speculated that removal would be expensive, difficult and time- consuming given the small nature of the plant and the difficulty of access to the habitat. Recurrent management would almost certainly be needed.

Hydrophilous Tall Herb (6430)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 6510

NAME: Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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.

Browne, Dunne, Roche (2002) A preliminary study of the Upper Shannon floodplain. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

European Commission (2007) Interpretation Manual of European Union Habitats. EUR27 Version. European Commission DG Environment.

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.

Heery, S. & Keane, S. (1999). Shannon Callows Management Plan. MPSU. National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Kearney, P. (2011) Habitat Mapping of Habitats in County Roscommon. Unpublished Report by the RPS Group for Roscommon County Council. Ireland.

Leahy, P.G. & Kiely, G. (2011) Short duration rainfall extremes in Ireland: Influence of climatic variability. Water Resource Management. 25 (3): 987-1003.

Martin, J.R., Gabbett, M., Perrin, P.M. & Delaney, A. (2007) Semi-natural grassland survey of Counties Roscommon and Offaly. Unpublished report for NPWS.

Maher, C. (in prep.) An examination of how flooding patterns and farming practices effect plant and marsh fly communities on unregulated floodplain meadows in Ireland. Ph.D Thesis submitted to the National University of Ireland, Galway.

NPWS (2007) Conservation Status Assessment Report: 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis). Unpublished Report, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

NPWS (2009) Site Inspection Report (1998-2009). Unpublished data. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (in prep.) National survey of Irish semi-natural grasslands 2007-2012: mapping classification and assessment. Irish Wildlife Manuals, No. XX. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

O'Neill, F.H., Martin, J.R., Perrin, P.M., Delaney, A., McNutt, K.E. & Devaney, F.M. (2009) Irish Semi-natural grasslands survey. Annual Report No. 2: Counties Cavan, Leitrim, Longford & Monaghan. Unpublished report for NPWS.

O'Neill, F.H., Martin, J.R., Devaney, F.M., McNutt, K.E., Perrin, P.M. & Delaney, A. (2010) Irish Semi-natural grasslands survey. Annual Report No. 3: Counties Donegal, Dublin, Kildare & Sligo. Unpublished report for NPWS.

Rodwell, J.S. (ed.) (1992). British plant communities Volume 3: Grasslands and montane communities. Cambridge Community Press, Cambridge.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	6700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1962-2012	
2.3.7 Long-term trend direction	decrease (-)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	17400
	operator	N/A
	unknown	No
	method	The Favourable Reference Range (FRR) was calculated on a 10 km square basis and is a combination of the current range, as reported in this document, with the addition of historical data collected by Austin O'Sullivan between 1962 and 1972. The FRR area shown in 2.3.9 is greater than the figure in 2.3.1 due to the loss of 6510 habitat that occurred between 1962 and 2012. This loss in the habitat was a result of the intensification of agricultural farming systems (e.g. silage and haylage systems using modern high yielding varieties and fertiliser application replacing traditional hay meadows) that took place between 1962 and 2012. It is likely that some of these reported losses occurred after the EU Habitats Directive came into force in 1994. The current range for the 6510 habitat is very fragmented and insufficient to conserve the structure and functions of the habitat. Therefore the FRR has included both the current range and the historical range indicated by the O'Sullivan data (Bourke et al. 2007).
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.45		
2.4.2 Year or period	1995-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period	1962-2012		
2.4.9 Long-term trend direction	decrease (-)		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		

2.4.12 Favourable reference area	area (km)	
	operator	much more than (>>)
	unknown	No
	method	The FRA is expected to be much larger than the surface area reported in 2.4.1. Across much of its' range the 6510 habitat is represented by small fragmented areas of the Annex I habitat and this impedes both the structure and functions of the habitat. The FRA is therefore set as "much greater than" the current area with at least 110% of the current area required to achieve FRA. Further research is required to determine the area of habitat required for the structure and functions to accommodate all of the 6510 habitat's typical species, including both plants and animals.
2.4.13 Reason for change	Genuine Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
grassland removal for arable land (A02.03)	high importance (H)	N/A
abandonment / lack of mowing (A03.03)	high importance (H)	N/A
Fertilisation (A08)	high importance (H)	Nitrogen input (N)
species composition change (succession) (K02.01)	medium importance (M)	N/A
problematic native species (I02)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A
agricultural intensification (A02.01)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	high importance (H)	N/A
grassland removal for arable land (A02.03)	high importance (H)	N/A
abandonment / lack of mowing (A03.03)	high importance (H)	N/A
Fertilisation (A08)	high importance (H)	Nitrogen input (N)
species composition change (succession) (K02.01)	medium importance (M)	N/A

problematic native species (I02)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Knautia arvensis

Leucanthemum vulgare

Lotus corniculatus

Rhinanthus minor

Sanguisorba officinalis

Tragopogon pratensis

Alopecurus pratensis

Centaurea nigra

Crepis capillaris

Daucus carota

Filipendula ulmaria

Heracleum sphondylium

Lathyrus pratensis

Leontodon hispidus

Plantago lanceolata

Prunella vulgaris

Ranunculus acris

Trifolium pratense

Trisetum flavescens

Viccia cracca

Dactylorhiza fuchsii

Leontodon autumnalis

Hypochaeris radicata

Bromus racemosus

Hordeum secalinum

Pimpinella major

2.7.2 Species method used	Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of one high quality species (usually species that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures) to pass the typical species component of the structure and functions assessment. The high quality species are Bromus racemosus, Hordeum secalinum, Knautia arvensis, Leucanthemum vulgare, Lotus corniculatus, Pimpinella major, Rhinanthus minor, Sanguisorba officinalis, Tragopogon

pratensis, and all orchid species. The typical species list for this habitat includes species that are characteristic, indicative, or common within the 6510 habitat in Ireland. In 2013 the list of typical species was reviewed based on the data collected during the ISGS.
The list of typical species differs slightly from the one applied in 2006, with the current list based on an extensive survey of 35 (one of the 36 surveyed sites had no structure and functions data recorded) 6510 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full account of the data presented in EU Commission Interpretation Manual (2007).

2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	See O'Neill et al. (in prep.) for a full list of the structure and functions criteria assessed. Features of the field and ground layers were assessed, including minimum/maximum thresholds for %cover within a 2m x 2m standardised plot. Criteria such as the cover of negative indicator species were also assessed. All assessment stops that failed structure and functions were checked to examine the reason for failure. When stops had only failed on one or two criteria the reasons for the stops failing were ascertained and expert judgement was applied to decide if the overall structure and functions was passable. After applying these criteria 64% of all ISGS assessment stops and 40% of the 35 ISGS sites had a Favourable assessment for structure and functions. When the area of each 6510 site was taken into account, 50% of the assessed area had Favourable structure and functions and 39% was Bad. The total area of habitat within SACs where it is a Qualifying Interest =0.63 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Bad (U2) qualifiers stable (=)
2.8.2 Area	assessment Bad (U2) qualifiers stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers stable (=)
2.8.4 Future prospects	assessment Bad (U2) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min 0.81 max 0.81
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)
3.1.3. Trend of surface area	stable (0)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative Contractual Recurrent	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 6510	
0.2 Habitat code	The Annex I habitat 6510 is represented in Ireland by mesotrophic semi-natural grasslands that are almost always managed as traditional hay meadows (cut only 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. However, they have been found on flatter ground amongst low hills, drumlins, and there are also some sites on the coast. The habitat is only rarely found in submontane (200-400 m) areas. Overall the Shannon Callows accounts for approximately 40% of the areas of 6510 within the State. The 6510 habitat is comprised of a few distinct meadow communities belonging to the Arrhenatherion. These communities can be classified within the Trifolium pratense - Plantago lanceolata (O'Neill et al. in prep.), Lathyrus pratensis community (Heery 1991) and MG4/MG5 (Rodwell 1992).
1.1.02 Method used - map	Field surveys carried out between 2007 and 2012 for the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.) provide the majority of the data on which the assessment of 6510 is based. Heery & Keane (1999) was an important data source for the Shannon Callows and Kearney (2011) provided the data for two sites in Co. Roscommon. Data available in Natura 2000 forms and associated documents provided the remaining data on which the national assessment of the 6510 habitat was based. Grassland relevés collected by Austin O'Sullivan between 1962 and 1972 were also analysed against the 6510 structure and functions criteria utilised by O'Neill et al. (in prep.) and 86 of the relevés were considered to represent the 6510 habitat. Due to problems interpreting the original location data only 66 of the points could be mapped. As the O'Sullivan data are over 40 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 FRR.
1.1.03 Year or period	Most of the data on which the assessment was based were collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.). The data presented in Kearney (2011) was collected in 2011, the data in Heery & Keane (1999) was collected in 1999. The data for the four 6510 polygons that were based primarily on data available in Natura 2000 forms and associated documents, were collected between 1995 and 2009.

Field label	Note
Habitat code: 6510	
2.2 Published sources	O'Neill et al. (in prep.) used the data collected during the Irish Semi-natural Grassland Survey (ISGS) to define the criteria for 6510 that were applied when writing this conservation assessment. The ISGS (data collected from 2007 to 2012) sampled all areas of the State where the Annex I habitat 6510 is thought to occur. Heery & Keane (1999) provided data that were utilised in the production of this conservation assessment. The majority of the areas visited by Heery & Keane (1999) were revisited during the ISGS between 2007 and 2012. The two datasets were analysed and any changes observed between Heery & Keane (1999) and the ISGS dataset were either attributed to 6510 habitat having been lost or slight differences between the two studies in the interpretation of what constituted the 6510 habitat. Kearney (2011) included two meadow sites in Co. Roscommon that had been mapped on an aerial photograph base map. The species lists for these sites included many of the indicator species for the 6510 habitat. Maher (in prep.) is a study of floodplain meadows in Ireland, the study provided no additional location data but did contribute information on the management of the 6510 habitat. The data utilised from the Natura 2000 forms and associated NPWS documents included location data and lists of the vascular plant species that were found in these locations.
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	The majority of data on which the calculation of the range was based was collected between 2007 and 2012 during the Irish Semi-natural Grasslands Survey (O'Neill et al. in prep.). Data from Kearney (2011), Heery & Keane (1999), and Natura 2000 forms and associated documents (data collected between 1995 and 2009) were also utilised when calculating range.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is some evidence that the climatic factors that contribute to the range of this Annex I habitat have changed in the last 12 years (Leahy & Kiely 2011; Maher in prep.). Both these publications highlight the problems of increased flooding events, with Maher (in prep.) discussing how this can lead to farmers altering traditional management regimes and subsequent changes in plant communities. Although it is expected that the effects reported by Maher (in prep.) are having some short-term effect on the area of 6510 habitat no evidence was found for any short-term effect on the range of the habitat. The ISGS found evidence of some recent losses in the 6510 habitat area but none of these have impacted on the range of the habitat. It should be noted that the method used to calculate the range has changed since the 2007 reporting period, due to the use of the range tool. Also for the 6510 habitat a more comprehensive dataset has been collected since 2007 (O'Neill et al. in prep.) resulting in improved understanding and definition for the habitat in Ireland and a more accurate distribution map on which to base the range.
2.3.06 Long-term trend - Period	The long-term trend period is best described from 1962 to 2012 as this is the period the main datasets cover.

Field label	Note
Habitat code: 6510	
2.3.07 Long-term trend - Trend direction	Comparing the geographical range of the 6510 sites recorded by Austin O'Sullivan between 1962 and 1972 (Bourke et al. 2007)and the ISGS between 2007 and 2012 there does appear to have been a decrease in the range. This decrease would be expected as there has been a decline in the use of traditional hay meadows in farming systems over the last 50 years. The Austin O'Sullivan data seems to indicate that the biggest decline has occurred in Counties Monaghan and Galway. It should be noted that the site selection criteria utilised by O'Neill et al. (in prep.) was aimed at locating areas of semi-natural grassland of high conservation value and was not focused solely on selecting 6510 hay meadows, during the course of the survey it was recognised that traditional hay meadows are one of the more difficult habitats to identify prior to a field survey. This contributes to difficulties in quantifying the extent of loss of this Annex I habitat in the long-
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The range calculated for the 2001-2006 reporting period (NPWS 2007) was estimated based on incomplete survey. Range calculated for the current reporting period is based on an almost complete nationwide survey. The range of the Annex I habitat has increased significantly from the range reported in 2007 (NPWS 2007).
2.3.10 c) Reason for change - use of different method	The Range tool was employed to derive range rather than manual method used in 2007.
2.4.01 Surface area	Surface area is primarily based on the 6510 mapping carried out by O'Neill et al. (in prep.), the Irish Semi-natural Grasslands Survey (ISGS) 2007-2012 provided the data for this publication and surveyed many of the areas where the Annex I habitat 6510 is thought to occur. Heery & Keane (1999) provided additional data for the Shannon Callows that was utilised when mapping the area of 6510. Many of the areas that were mapped in 1999 were revisited between 2007 and 2012 by the ISGS. Although there were some differences in the interpretation of the 6510 habitat between the two projects generally the areas of 6510 mapped by the two surveys tally well. Heery was the first ecologist to study the lowland hay meadows (6510) of the Shannon Callows and has expert knowledge of the subject. Kearney (2011) mapped two meadow sites in Co. Roscommon that included many of the indicator species for the 6510 habitat and were mapped on aerial photographs. Browne et al. (2002) was consulted but no reference to areas of 6510 or similar meadow communities could be found. Data available in Natura 2000 forms and associated NPWS documents provided the remaining data on which the calculation of the surface area of the 6510 habitat was based. All areas were confirmed using the 2005 aerial photographs. Due to the fact that the 6510 relevés recorded by O'Sullivan are over 40 years old it was decided not to include these data within the 6510 surface area reported here. The reported surface area of 1.45 km2 is much higher than the area of 0.2km2 reported for the previous period (2001 to 2006). The reason for the increase in area is due to the current report being based on a complete dataset (O'Neill et al. in prep.). It should be noted that the Shannon Callows is a very important region within Ireland for the 6510 habitat accounting for 41% (0.6 km2) of the habitat nationally. It should also be noted that surveying for areas of the 6510 habitat can be difficult as there is usually only a couple of months (mid-May to mid-July) during the field season when the community can be studied before it is cut and then usually grazed. The 1.45 km2 surface area for 6510 reported here is likely to be an underestimate of the total area of the habitat in Ireland.

Field label	Note
Habitat code: 6510	
2.4.02 Year or period	Field surveys carried out between 2007 and 2012 for the ISGS (O'Neill et al. in prep.) provide the majority of the data on which the assessment of 6510 is based. Heery & Keane (1999) was an important data source for the Shannon Callows and Kearney (2011) provided the data for two sites in Co. Roscommon. Some of the data utilised from the Natura 2000 forms and associated documents (NPWS data sources) was originally collected in 1995, all areas were confirmed using the 2005 aerial photographs.
2.4.05 Short-term trend - Trend direction	For each of the 36 ISGS sites containing 6510 the area of the Annex I habitat mapped at the time of the field survey was compared with the area observed on the 2000 aerial photographs and any observable increases or decreases in area were mapped (O'Neill et al. in prep.). Of the 36 6510 sites that were surveyed a loss in area of 0.04 ha was observed at one site due to the disposal of waste. Two of the 36 sites showed a small increase in the area of 6510 of 0.1 ha due to scrub clearance and recovery from livestock damage. During the survey of the Shannon Callows by the ISGS in 2007 two areas were noted that were recorded as the 6510 habitat in 1999 (Heery & Keane 1999) but could no longer be classified as the Annex I habitat. In one case the area had been abandoned and the plant community was now rank and dominated by large grasses. In the second case the area was managed as cattle pasture rather than a hay meadow. It should be noted that there were other differences in the areas of 6510 recorded by the two surveys, but these were always more likely to be due to differences in mapping techniques, or slight differences in the interpretation of the 6510 habitat used. The loss of the two areas of 6510 since 1999 represents a 3.4 ha loss, which is 6% of the current area of the Annex I habitat in the Shannon Callows and 2% of the national resource. These data indicate that over the last 12 years the area of 6510 within the State has declined. However, on review NPWS consider that this loss is not significant and the trend for area is stable. Often the changes that are causing this decline, for example former meadows that are no longer cut but are managed as pasture, or fertiliser application and reseeding with higher yielding agricultural species, are very difficult to observe without visiting sites and recording the plant community. Therefore any observed differences using aerial photographs are an under representation of the true nature of the change.
2.4.07 Short-term trend - Method used	Short-term trend direction is based on the 36 ISGS sites containing 6510 that were surveyed between 2007 and 2012 (O'Neill et al. in prep.) and the area of 6510 surveyed in the Shannon Callows in 1999 (Heery & Keane 1999) and 2007 by the ISGS.
2.4.09 Long-term trend - Trend direction	Due to a decrease in the number of 6510 sites recorded in Monaghan and Galway between 1962 and 2012; from analysis of the O'Sullivan data collected between 1962 and 1972 (Bourke et al. 2007) and the ISGS data collected between 2007 and 2012, it would be expected that the area of this Annex I habitat has also decreased over the long-term. This decrease can be attributed to a decline in the use of traditional hay meadows, as a source for winter animal feed, and an increase in agricultural intensification over the last 50 years.
2.4.13 a) Reason for change - genuine change?	The ISGS data collected between 2007 and 2012 have shown than there has been a genuine change in the area of this Annex I habitat (section 2.4.5) with a minimal value of 2% of the national area lost between 1999 and 2007.

Field label	Note
Habitat code: 6510	
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The reported surface area for 6510 of 1.45 km2 is much higher than the area of 0.2km2 reported for the previous period (2001 to 2006). The reason for the increase in area is due to the current report being based on a complete dataset (O'Neill et al. in prep.). It should be noted that the Shannon Callows is a very important region within Ireland for the 6510 habitat accounting for 41% of the habitat nationally.
2.5 Main pressures	The pressures listed are based on data presented in O'Neill et al. (in prep.). The Sites Inspection Reports (SIR) of NPWS rangers was also consulted and the additional impact of dredging/ removal of limnic sediments was added to the list of pressures. Due to inconsistencies in interpretation of the 6510 habitat it was decided not to incorporate all SIR records in the list of pressures.
2.5.01 Method used - pressures	Based on the data in O'Neill et al. (in prep.) abandonment/lack of mowing, problematic native species (e.g. bracken) and succession to scrub are the three main reported pressures on the habitat. Due to the fact that the more detailed updated activity codes were utilised from 2010, the frequency data presented is based on the 22 6510 sites surveyed from 2010 to 2012. Abandonment/lack of mowing was recorded at 4 (18%) sites. Problematic native species and succession were each recorded at 3 (14%) of the sites, often at a low intensity. All the other pressures reported in O'Neill et al. (in prep.) were recorded at less than 3 sites. The impacts of agricultural intensification, grassland removal for arable land and fertilisation were each recorded at two or less sites, but where they were observed their impact was high. Due to the fact that it can be difficult to observe these impacts actually taking place during one field visit it was decided that these three pressures had been under-recorded and their impact nationally was considered high. The previous conservation assessment for this habitat (NPWS 2007) listed a different set of pressures for this Annex I habitat. Mowing/cutting was listed as a pressure in 2007 although it is considered a positive management activity for the 6510 habitat. Other pressures listed in 2007 that were not noted as significant pressures during the current report include landfill, drainage, routes and urbanised areas. Some of the differences between the two reporting periods can be accounted for by the more detailed activity codes that have been utilised since 2010.

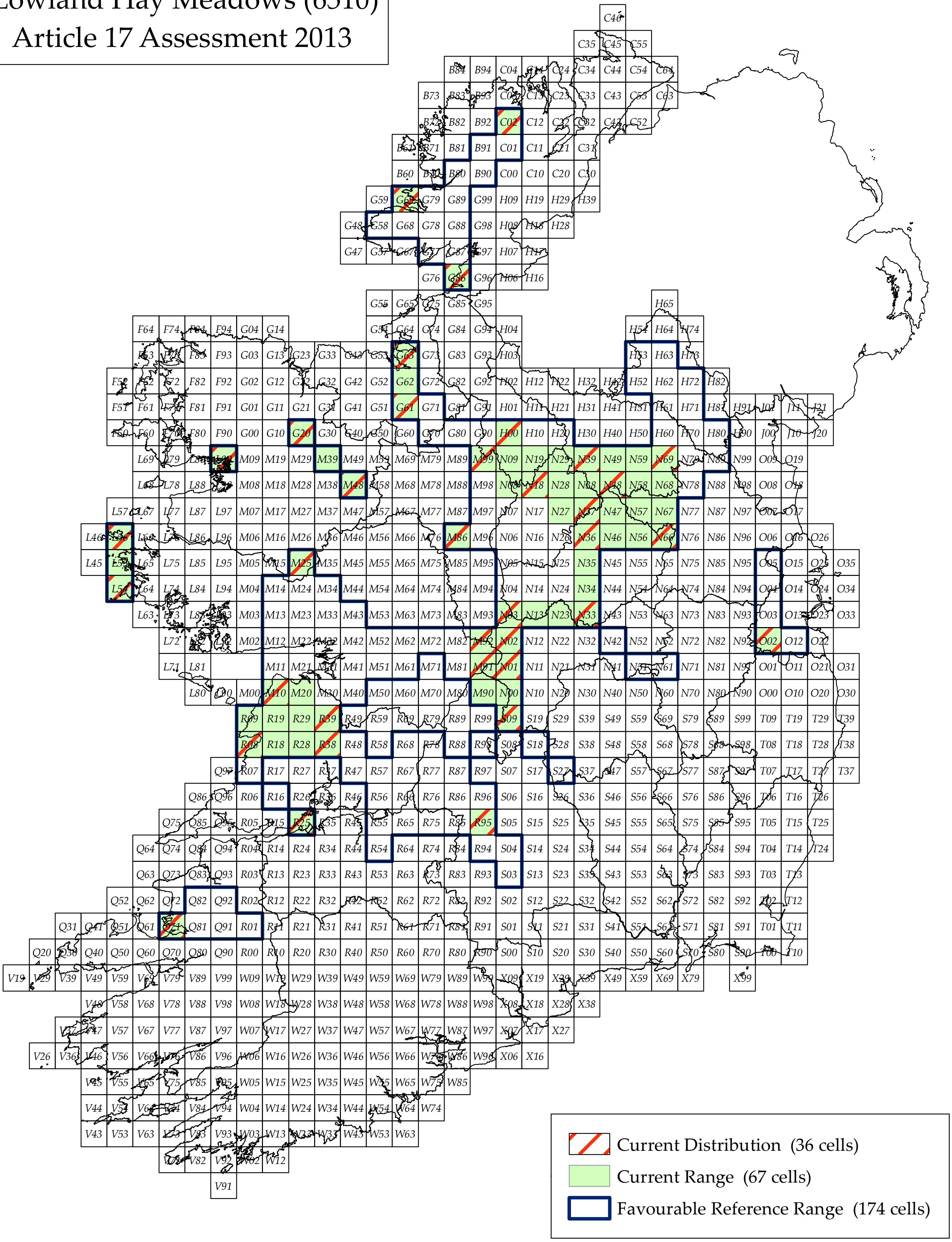
Field label	Note
Habitat code: 6510	
2.6 Main threats	The threats listed are based on the pressures from section 2.5 a. It is considered that each of the pressures noted in 2.5 a are common impacts that will continue to have a negative effect on the conservation status of the 6510 habitat over future reporting periods (specifically the next 12 years). Surveys of the habitat were carried out between 2007 and 2012 to assess structure and functions within representative areas of the Annex I habitat (O'Neill et al. in prep.). Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1. Within the 7 species there had to be a minimum of one high quality species (usually species that are more indicative of the Annex I habitat and/or less tolerant of agricultural improvement or other negative pressures) to pass the typical species component of the structure and functions assessment. The high quality species are Bromus racemosus, Hordeum secalinum, Knautia arvensis, Leucanthemum vulgare, Lotus corniculatus, Pimpinella major, Rhinanthus minor, Sanguisorba officinalis, Tragopogon pratensis, and all orchid species. The typical species list for this habitat includes species that are characteristic, indicative, or common within the 6510 habitat in Ireland. In 2013 the list of typical species was reviewed based on the data collected during the ISGS. The list of typical species differs slightly from the one applied in 2006, with the current list based on an extensive survey of 35 (one of the 36 surveyed sites had no structure and functions data recorded) 6510 sites from across the national range of the habitat and the analysis of these data. As detailed in O'Neill et al. (in prep.) the list of typical species has taken full account of the data presented in EU Commission Interpretation Manual (2007).
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although over the short-term the range of the 6510 habitat is stable there is evidence that the current range is smaller than the FRR (section 2.3.7) and for this reason the overall assessment for range is Bad.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	Over the short-term the range is considered to be stable (see section 2.3.4).
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There are significant examples listed in this document that show that the current area is less than the historic area and some of these losses in area have occurred during the last two reporting periods with a 2% loss in the current 6510 area reported between 1999 and 2007. These losses in themselves would result in an overall assessment of Inadequate but it is the large difference between the current reported area and the FRA that has been significant in the overall assessment for range being Bad.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The area is considered to be stable within the current reporting period. There is evidence that the area of 6510 has declined nationally by a minimal value of 2% (based on data collected between 1999 and 2007). On review NPWS consider that this loss is not significant and the qualifier for area is stable.

Field label	Note
Habitat code: 6510	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The 35 (one of the 36 surveyed sites had no structure and functions data recorded) 6510 grassland sites monitored between 2007 and 2012 (O'Neill et al. in prep.) were used as a proxy for the national resource of this Annex I habitat. When deciding on the thresholds used to assess the national status of structure and functions, the following criteria were applied. If >99% of the assessed area within Ireland has a favourable status, then structure and functions are favourable nationally. If >=25% of the assessed area has a status of Bad, then structure and functions are bad nationally. Any other situation results in a national assessment of Inadequate. As only 50% of the area of 6210 assessed during the current reporting period had a Favourable structure and functions, the national assessment for 6510 is Bad In the future there is definitely an argument for expanding the range of typical species and for ecologists to propose more specific typical species lists that assess the structure and functions of a particular site. It would also be expected that in the future fauna, as well as flora, would be utilised for many sites. However, to assist ecologists in the identification of the 6510 habitat a list of typical species that are particularly characteristic, indicative, or common for the habitat in Ireland has been proposed.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structure and functions is considered to be stable. The 2007 report on this habitat provided no comparable data on structure and functions, but expert opinion based on the study of the 6510 habitat over the last six years is that the trend for structure and functions is probably stable. Over the long-term the evidence presented in this report indicate that the 6510 habitat has reduced in area, and in some regions of the State become much more fragmented. Fragmentation and declining area are processes that contribute to a reduction of ecological function.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters is Bad and considered to remain bad for the foreseeable future (12 years) the future prospects are assessed as Bad. An assessment of Bad was made for the last reporting round (NPWS 2007). Although there is evidence that nationally the habitat is stable more data is required on the future trend of structure and functions. Table to assess 6510 parameters Parameter Actual Status Future trend Future status Prospects Range <FRV =stable <FRV Bad Area <FRV =stable <FRV Bad S&F <FRV =stable <FRV Bad
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Based on the findings of this assessment and the assessment of 6510 that took place in the previous reporting period the future prospects for this habitat are probably Bad but stable with the future trend for range, area, and structure and functions predicted to be stable.

Field label	Note
Habitat code: 6510	
2.8.05 Overall assessment of Conservation Status	The Annex I habitat 6510 is not at FCS. The reasons for this are that the current area, range, and structure and functions of the 6510 habitat are below the FRVs. It should be noted that the area and current range reported here are much larger than the figures reported in 2006, with the 6510 area increasing from 0.2km2 to 1.45 km2. This increase in area is due to improved knowledge arising from the NPWS undertaking a national survey for the habitat between 2007 and 2012. The figure reported in 2006 was an estimate. This current assessment of the 6510 habitat has highlighted the importance of the Shannon Callows with the region accounting for 41% of the national resource. The structure and functions that are necessary for the long-term maintenance of the habitat are below the FRV. Currently the FRV for structure and functions has been set nationally which assists habitat identification on a national scale but fails to take account of all the regional and local variation within the habitat. It is expected that as the monitoring programme for 6210 is developed and our understanding of the local variability within the structure and functions of the 6210 habitat increases the FRV for structure and functions will be set at a local or site specific level. If this more localised approach is taken it would be expected that over time a larger proportion of sites would attain favourable status for structure and functions. As range, area, and structure and functions were assessed as Bad the overall assessment of conservation status is Bad, the overall assessment for the habitat was also Bad in 2007 (NPWS 2007).
2.8.06 Overall trend in Conservation Status	In the commercial farming sector traditional hay meadows continue to be replaced by more intensive systems. However, during the ISGS it was noted that there appears to be a trend where State owned land and land owned by less commercial farmers is being returned to traditional hay meadow management. During the survey State owned sites such as Castletown House (Kildare) and Newbridge Demesne (Dublin) were noted as having returned large areas of grassland to hay meadow. Although neither of these sites currently contains meadows with the structure and functions of the 6510 habitat they did contain some of the typical species for this habitat and with continued traditional management the 6510 habitat could develop. It was also noted during the ISGS that farmers appreciated hay meadows, more than any other grassland habitat, both for their amenity and cultural value. It would be expected that agri-environment schemes and the implementation of Natura 2000 management plans would improve the management of the 6510 habitat within the State and contribute to the Annex I habitat moving towards FCS It is felt that nationally these positive factors will counteract negative trends, such as agricultural improvement and abandonment, and will contribute to a stable trend in conservation status.
3.1.01 a) Surface area - Minimum	The area of 6510 habitat within SACs is a minimum known area, with only areas that have evidence for the presence of the Annex I habitat mapped. There are 10 SACs that have 6510 listed as a qualifying interest and for five (SACs 000212, 000213, 001275, 001656, and 002111) of these there was no overlap between the 6510 10k distribution and the SAC shapefile. During the ISGS and associated literature searches no credible evidence could be found for the presence of the Annex I habitat within four of the SACs. For SAC 002111 there is evidence for the presence of a 6510 meadow in the information associated with the Natura 2000 form but when the site was surveyed by the ISGS in 2012 (the main ISGS sites within SAC 02111 are 2221, 2225, 2241, and 2228) the 6510 habitat was not located. It should be noted that for SAC 000020 there is no evidence for the 6510 habitat within the boundaries of the SAC but there is an area of 6510 adjacent to the SAC within the 10k_distribution shapefile for 6510.

Field label	Note
Habitat code: 6510	
3.1.01 b) Surface area - Maximum	It is unknown what the maximum is and therefore a nominal figure equal to the minimum has been entered.
3.1.03 Trend of surface area within the network	As the trend for 6510 area (Section 2.4.5) is assessed to be stable the trend for area within the SAC network was also assessed as stable.
3.2 Conservation measures	Within the current reporting period O'Neill et al. (in prep.) reported mowing as a positive activity of high importance at 89% of the 6510 sites surveyed. A significant proportion of the mowing was non-intensive. After-grazing is also an important component of traditional hay meadow management and this was recorded at six (27%) of the 22 sites that were surveyed from 2010 to 2012 (period where updated activity codes were applied), with cattle and horses the most common species. After-grazing has probably been under-reported in O'Neill et al. (in prep.) as the majority of 6510 meadows were surveyed before they were cut. A significant proportion (56%) of the 6510 habitat is located within SACs, which together with the legal protection of the Annex I habitat should contribute towards maintaining the conservation status. The effectiveness of protected areas and the legal protection provided to the 6510 habitat have yet to be evaluated. The 6510 habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Also Environmental Impact Assessment (EIA) by regulatory authorities protects the habitat from damage. Lowland hay meadows are an excellent example of a valuable but widespread habitat created in the past by an agricultural practice which has now been lost to a very large extent to modern systems of farming which are seen as more efficient and productive. Restoration would be costly, on a recurrent basis, and many farmers may be reluctant even to consider reverting to traditional methods . Targeted and appropriately designed agri-environment schemes and measures scheme could be devised to improve the management of the 6510 habitat within the State and contribute to the conservation of the Annex I habitat. However the NPWS scheme, as currently funded, can cater for only a relatively small number of farmers and can achieve only a limited effect. A small proportion of 6510 sites include protected species such as Corncrake (Crex crex) and Meadow barley (Hordeum secalinum); the presence of these species provides additional protection of the habitat.

Lowland Hay Meadows (6510)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7110

NAME: Active raised bogs

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

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., Connolly K., Crowley W., Denyer J., Duff K. & S, Smith G. (in prep.) Raised Bog Monitoring Project 2013. Irish Wildlife Manuals, No XX. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-5, Unpublished report, National Parks & 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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Fernandez, F. Crowley, W. & Wilson S. (2012) Raised Bog Monitoring Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.
Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.
Moore, P.D. & Bellamy, D.J. (1974) Peatlands. Elek Science, London. 221pp.
Kelly, L. (1993) Hydrology, Hydrochemistry and Vegetation of Two Raised Bogs in Co. Offaly, Ph.D. thesis, Trinity College Dublin.
Kelly, L. Doak, M. and Dromey, M. (1995) Raised Bog Restoration Project, an investigation into the conservation and restoration of selected raised bog sites in Ireland. Internal report to the National Parks and Wildlife Service, 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.
NPWS (2008) The Status Of EU Protected Habitats And Species In Ireland. Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of the Environment, Heritage

and Local Government. Dublin.
Schouten, M.G.C. (1984) Some aspects of the ecogeographical gradient in the Irish ombrotrophic bogs, paper presented to 7th Int. Peat Congress, Dublin, vol. 1, pp. 414-432, The International Peat Society, Helsinki.
White, J. and Doyle, G. (1982) The vegetation of Ireland: a catalogue raisonne. J. Life Sci. 3: 289 – 268.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	13700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	26100
	operator	N/A
	unknown	No
	method	Favourable Reference Range is considered to correspond with the Range of Degraded Raised Bog habitat (capable of regeneration) (7120). This is based on the official EU definition of habitat 7120, as being 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).
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	19.55				
2.4.2 Year or period	1994-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	decrease (-)				
2.4.6 Short-term trend magnitude	min	0.5	max	1	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	215.2			
	operator	N/A			
	unknown	No			
	method	Favourable Reference Area is considered to correspond with the extent of both Active and Degraded Raised bog resources within designated sites as described by Fernandez et al. (in prep.). This is based on the official definition of Degraded Raised Bog habitat (still capable of regeneration) (7120); which implies that this habitat should be restorable to Active Raised Bog habitat. All the high bog which is not currently Active has been called Degraded. This is			

almost certainly a significant overestimate as not all of this bog will be restorable to active bog. On the other hand the Degraded bog definition excludes cutover bog, significant areas of which will have restoration potential. Restoration will be targeted at the hydrological units, generally whole bog basins (including the cutover areas), which are deemed most suitable for the restoration throughout the entire range of raised bogs. Thus, for example, cutover areas adjacent to Active Raised Bog within designated sites may be particularly targeted for restoration works in order to support the current Active bog and to optimise the restoration potential of the whole bog unit, including the cutover. The current Favourable Reference Area must therefore be considered as only approximate until further hydrological and topographical studies provide more accurate data on the area which can be potentially be restored.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
fire and fire suppression (J01)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
grazing (A04)	low importance (L)	N/A
motorised vehicles (G01.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
fire and fire suppression (J01)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
grazing (A04)	low importance (L)	N/A
motorised vehicles (G01.03)	low importance (L)	N/A

2.6.1 Method used – threats	modelling (2)

2.7 Complementary Information

2.7.1 Species

Andromeda polifolia
Drosera anglica
Drosera intermedia
Drosera rotundifolia
Eriophorum angustifolium
Eriophorum vaginatum
Menyanthes trifoliata
Narthecium ossifragum
Rhynchospora alba
Utricularia minor
Vaccinium oxycoccos
Aulacomnium palustre
Campylopus atrovirens
Leucobryum glaucum
Pleurozia purpurea
Racomitrium lanuginosum
Sphagnum austinii
Sphagnum capillifolium
Sphagnum cuspidatum
Sphagnum denticulatum
Sphagnum fuscum
Sphagnum magellanicum
Sphagnum papillosum
Sphagnum pulchrum
Sphagnum subnitens
Cladonia ciliata
Cladonia portentosa

2.7.2 Species method used

Species list is based on vegetation communities defined by Kelly (1993) and Kelly and Schouten (2002). These vegetation communities were used to map the extent of ecotopes on the ground by Fernandez et al. (2005), Fernandez et al. (2012) and Fernandez et al. (in prep.). The typical species were derived from the best quality vegetation types. This includes vascular plants, bryophytes and lichens (Cladonia spp.). Although typical species were not directly used to assess the habitat's Structure & Functions conservation status, the Structure & Functions assessment was based on the variation in the extent of best quality vegetation (ecotopes). Good quality species indicators, also included in the typical species list, are found within the best quality ecotope types (particularly certain Sphagnum spp.).
A similar typical species list has been given to both Active Raised Bog habitat (7110) and Degraded Raised Bog habitat (7120). However, their frequency would vary between both habitats.

2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.2 Area	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	declining (-)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	14	max	14
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving the hydrological regime (4.2)	Legal Administrative Contractual	high importance (H)	Both	Enhance Long term
Other wetland-related measures (4.0)	Legal Administrative Contractual	high importance (H)	Both	Enhance Long term

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 7110	
0.1 Member State	Ireland
0.2 Habitat code	Raised bogs are accumulations of deep acid peat (3-12m) 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 (Fossit, 2000). The bog dome is primarily rainwater fed (ombrotrophic mire) and isolated from the local groundwater table. This gives rise to acidic conditions deficient in plant nutrients and in turn supports a distinctive suite of vegetation types, which although low in overall diversity, support specialised plant assemblages dominated by a range of mosses of the genus Sphagnum. The mire expanse 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. However, although Degraded Raised Bog may contain a similar species selection to Active Raised Bog, the relative abundance of individual species is different, with a lower cover of Sphagnum spp. Irish raised bogs are classified as Oceanic raised bog mire (sensu 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 raised bog that is still hydrologically intact is assigned to the Oxycocco-Sphagnetea and to the Erico-Sphagnetum magellanici phytosociological association (White and Doyle, 1982). Raised bogs are more abundant in the lowlands of central and mid-west Ireland and are confined to areas with an annual rainfall below 1,250 mm (Hammond, 1984). They occur principally in land below 130m. Irish raised bogs are classified into two sub-types: Western (Intermediate) raised bogs or True Midland raised bogs (Schouten, 1984), with the boundary between the two being taken as the 1,000mm isohyet. Degraded Raised Bog is characterised by the complete absence, or at best the presence of only a patchy thin cover of an acrotelm layer. The acrotelm is the living, actively growing upper layer of a raised bog. The presence of 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 from the bog. Degraded Raised Bog, which the EU definition restricts to uncut high bog, in Ireland is considered to encompass sub-marginal, marginal and face bank ecotopes (Kelly (1993) and Kelly and Schouten (2002)) as well as inactive flushes and dry woodland on bog. Depressions on peat substrates of the Rhynchosporion (7150) are also found within Degraded Raised Bog habitat (7120). The official EU definition of the habitat (still capable of regeneration), indicates that the habitat can be restored to Active Raised Bog habitat (7110). If areas currently considered as Degraded habitat cannot actually be restored then they do not qualify as habitat 7120. On the other hand Degraded habitat is not considered to include areas of secondary degraded raised bog such as highly drained high bog devoid of vegetation and cutover bog. Although such areas do not correspond with the strict definition of Degraded Raised Bog within the Habitats Directive Interpretation Manual, the re-establishment of vegetation with peat forming capability in these areas may be possible. In some cases it may be even more feasible to restore some of these areas to active bog than some areas of what would be considered typical Degraded Raised Bog.
1.1.01 Distribution map	This map represents the map referred to in 1.1.4 which has been transformed to the LAEA projection.

Field label	Note
Habitat code: 7110	
1.1.02 Method used - map	Fernandez et al. (in prep.) updated the 2007 habitat distribution map based on data from the most recent raised bog surveys. These include surveys in 2012-13 (Fernandez et al. in prep.), 2011 (Fernandez et al. 2012) and 2009 (Fernandez et al. 2009a & 2009b). These surveys were undertaken at ecotope level based on Kelly (1993) and Kelly and Schouten (2002) vegetation classification. The new habitat distribution map also includes habitat records from surveys undertaken in 2009 by Bord na Móna (Bord na Móna Ecology Team pers. comm. 2013). These datasets represent 49.9% (975ha) of the estimated total habitat resource (1,955ha). The remaining 50.1% (980ha) of Active Raised Bog corresponds with habitat data mapped also at ecotope level but collected before 2007 (1994-2005).
1.1.03 Year or period	1994-2012
1.1.04 Additional distribution map	Habitat data records reported from the listed surveys were used to generate the 10 km distribution map by intersecting each individual habitat record from these sources with the 10km Irish National Grid.
1.1.05 Range map	Range map was derived based on the IT Tool version 10.0 (30/08/2012) generated by ETC/BC.
2 Biogeographical level	ATL
2.1 Biogeographical region or marine regions	ATL

Field label	Note
Habitat code: 7110	
2.2 Published sources	Overview of some of the main publications 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. This project undertook habitat surveys at ecotope level for a selection of 29 raised bogs in the 1999-2000 period. Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & S, Smith G. (in prep.) Raised Bog Monitoring Project 2013. Irish Wildlife Manuals, No XX. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. This project summarised the individual site conservation assessment results for habitats 7110, 7120, 7150 and 91D0 undertaken for a total of 44 raised bogs (43 SACs and 1 NHA) surveyed as part of Fernandez et al. (2012) and this project. The report also includes the assessment of the conservation status of 7110 and 7120 at national level following the Art. 17 EU Habitats Directive reporting guidelines. Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-5, Unpublished report, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. This project summarised the individual site conservation assessment results for raised bog habitats (7110, 7120, 7150 and 91D0) undertaken for a total of 48 raised bogs in the 2004-2005 period. 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. This project assessed the impact of turf cutting in all designated raised bogs (both SACs and NHAs) in Ireland. As part of the project habitat surveys at ecotope level were undertaken for a selection of raised bogs. Fernandez, F. Crowley, W. & Wilson S. (2012) Raised Bog Monitoring Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. This project summarised the individual site conservation assessment results for raised bog habitats (7110, 7120, 7150 and 91D0) undertaken for a total of 12 raised bogs in 2011.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	See 1.1.2 & 1.1.4
2.3.03 Short-term trend - Period	Default 2001-2012 trend period was used. This is based on the assessments undertaken by Fernandez et al. (2005) and Fernandez et al. (in prep.). The latest also includes assessments for 5 raised bogs surveyed in early 2013.
2.3.04 Short term trend - Trend direction	Evidence from aerial photographs and field visits (Fernandez et al. (2005), Fernandez et al. (2006) and Fernandez et al. (in prep.)) over the period does not suggest any change in Range. Thus a Stable trend was given.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The current habitat Range value is different to the one reported in 2007. However, this is the result of improvement in habitat knowledge, rather than any actual change.
2.3.10 c) Reason for change - use of different method	The use of the standardised range tool has also resulted in a change to the Range compared to 2007.

Field label	Note
Habitat code: 7110	
2.4.01 Surface area	Habitat data is derived from field surveys compiled and described by Fernandez et al. (in prep.), which involved vegetation mapping at ecotope level based on methods developed by Kelly (1993) and Kelly and Schouten (2002) (See 1.1.2 for list of sources). The Active raised bog habitat consists of two ecotopes (central and sub-central) and active peat forming flushes. Bog Woodland habitat (91D0), on raised bog, is also deemed part of habitat 7110, as it also actively peat forming. 40ha within the total habitat reported (1,955ha) is derived from habitat data reported in 2009 by Bord na Móna (Bord na Móna Ecology Team, pers. comm., 2013). These habitat records were not mapped at ecotope level but at Fossit habitat classification (Fossit, 2000) and EU habitat level.
2.4.02 Year or period	49.9% of the Active raised bog habitat Area was surveyed during the 2007-2013 period. The remaining 50.1% was recorded in the 1994-2005 period as described by Fernandez et al. (in prep.). The current extent of the latter may now be smaller as a result of habitat losses caused by impacting activities since the last surveys (1994-2005).Therefore it is possible that the area figure given in 2.4.1 may overestimate the current extent of the habitat.
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	Default 2001-2012 trend period was used. This is based on the assessments undertaken by Fernandez et al. (2006) and Fernandez et al. (in prep.). The latter includes assessments for 5 raised bogs surveyed in early 2013. The inclusion of data from these sites is acceptable as no significant change in area of active bog will have occurred in the short time between the end of the 2012 reporting period and the survey.
2.4.05 Short-term trend - Trend direction	An overall Decreasing trend has been given for the 2001-2012 period. This is based on the Decreasing trends given by the last two Raised Bog Monitoring Surveys: Fernandez et al. (2005) reported a 36.8% (ca 581ha) decrease for 48 raised bog assessed in the 1994/95-2004/05 period and Fernandez et al. (in prep.) reported a 1.6% (ca 13.5ha) decrease in the 2004/05-2011/13 period for 44 raised bog assessed. Fernandez et al. (2005) mentioned that the 36.8% figure could have been overestimated due to differences (e.g. vegetation interpretation and mapping techniques) between the 2005 survey and the original surveys undertaken by Kelly et al. (1995). However they considered than the real decrease in habitat extent between 1995 and 2005 was unlikely to be lower than 25%.Therefore, taking into account losses between 1995 and 2000, an approximate loss of 20-30% was estimated for the 2001-2012 period.
2.4.06 a) Short-term trend - Magnitude - Minimum	20%
2.4.06 b) Short-term trend - Magnitude - Maximum	30%
2.4.07 Short-term trend - Method used	See 2.4.5
2.4.12 b) Favourable reference area - Indicate if operators were used	
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The differences from the 2007 values are due to more accurate data.

Field label	Note
Habitat code: 7110	
2.5 Main pressures	Pressures were recorded at each raised bog site surveyed by Fernandez et al. (in prep.). Although it was not possible to estimate the proportion of the habitat impacted by each activity, these were ranked according to their level of Importance/Impact as High; Medium and Low. A high Importance/Impact indicates that the habitat's Area and/or Structure and Functions have been directly or indirectly impacted on by the activity in the reporting period. A total of 11 different pressures type were reported. All but Restoring/Improving the hydrological regime (4.2) and Forestry clearance (B02.02) were considered to have a negative impact on the habitat. These include, ranked by level of importance, the following: Drainage (J02.07) both on high bog and adjacent to high bog; Peat extraction (C01.03); Artificial planting on open ground (non-native trees) (B01.02) both on high bog and adjacent to high bog; Fire (J01); Quarrying (C01); Invasive alien (I01); Problematic native (I02); Grazing (A04); motorised vehicles (G01.03). The NPWS Site Inspection Form was also consulted but no additional information related to new highly impacting activities beside those already reported Fernandez et al. (in prep.) was obtained.
2.5.01 Method used - pressures	See 2.5.
2.6 Main threats	Fernandez et al. (in prep.) found that, within SACs there was a decrease in pressures from Peat cutting (C01.03); Drainage (J02.07); Artificial planting on open ground (non-native trees) (B01.02) on the high bog and Fire (J01). The remaining activities were given a stable trend. A different scenario for raised bogs NHAs and non-designated raised bogs was reported, where no decline in the reported pressures was identified. Despite the decline in some pressures within SACs, the list of threats is the same as the one for pressures.
2.6.01 Method used - Threats	See 2.6.
2.7.02 Typical species - method used	The species list is based on vegetation communities defined by Kelly (1993) and Kelly and Schouten (2002). These vegetation communities were used to map the extent of ecotopes on the ground by Fernandez et al. (2005) and Fernandez et al. (in prep.). The typical species were derived from the best quality vegetation types. This includes vascular plants, bryophytes and lichens (Cladonia spp.). Although typical species are not directly used to assess the habitat's Structure & Functions conservation status, the Structure & Functions assessment is based on the variation in the extent of best quality vegetation (ecotopes). Good quality species indicators, also included in the typical species list, are found within the best quality ecotope types (particularly certain Sphagnum spp.). A similar typical species list has been given to both Active Raised Bog habitat (7110) and Degraded Raised Bog habitat (7120). However, their frequency would vary between both habitats.

Field label	Note
Habitat code: 7110	
2.7.04 Structure and functions - Methods used	The Structure & Functions assessment for this habitat is based on the extrapolation of the results of the individual site assessments undertaken by Fernandez et al. (in prep.) at 44 raised bogs, which contain 42.07% of the national habitat resource, surveyed in the 2011-2013 period. While 5 of these bogs were surveyed in early 2013 their inclusion is acceptable as no significant change in area of active bog will have occurred in the short period between the end of the reporting period and the survey. Fernandez et al. (in prep.) undertook vegetation surveys at these 44 bogs at ecotope level based on Kelly (1993) and Kelly and Schouten (2002) vegetation types. Data from these surveys was compared to similar data for these 44 raised bogs from Fernandez et al. (2005) (43 raised bogs) and Derwin, J. & MacGowan, F. (2000) (1 raised bog). The assessment was based on the objective that at least half of the current habitat area should be made up of central ecotope and active flush (i.e. more pristine examples of Active Raised Bog habitat community types). This value is considered to be the Structure & Functions Favourable Reference Value. This is quite a modest target as a high bog that has never been impacted by drainage is likely to have had more than an 80% cover of these communities (Ryan J. pers. comm., 2012). Typical species were not closely monitored and their assessment is based on the variation of the best quality ecotopes within the habitat (i.e. central and active flush) where good quality indicator species are more abundant.
2.7.05 Other relevant information	The overall habitat extent within SACs is 1,400ha, which accounts for 71.61% of the national habitat resource (1,955ha). The entire habitat resource within SACs is listed as a qualifying interest for either Active Raised Bog or Bog Woodland habitat within a total of 53 SACs.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current habitat Range is 47.51% below the Favourable Reference Range, which corresponds with the range of Degraded Raised Bog habitat (7120), for which the definition is still capable of regeneration within a 30 year period. The current Range is different to the one reported in 2007. This is due an improvement in habitat knowledge, but also the use of different methods to calculate the Range. The ETC/BD Tool has now been used. The overall Range assessment is Unfavourable Bad- Stable.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	The habitat has been given a Stable trend. No variation in habitat Range was reported since 2007.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current habitat Area (1,955ha) is 90.92% below the Favourable Reference Area (21,520ha). The Favourable Reference Area value corresponded with the extent of both Active and Degraded Raised bog resources within designated sites. This was based on the official definition of Degraded Raised Bog habitat (still capable of regeneration) (7120); which implies that it should be possible to restore it to Active Raised Bog habitat within the habitats Favourable Reference Range. As noted in 4.4.12 d), this Favourable Reference Value is only approximate until further hydrological and topographical studies provide more accurate on the area which can be potentially be restored.

Field label	Note
Habitat code: 7110	
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Fernandez et al. (in prep.) results indicate that there has been a 1.61% (ca 13.5ha) decrease in the 2004/05-2012/13 period at the 44 raised bogs assessed. 43 of the 44 raised bogs assessed were assessed as Unfavourable Bad with the 44th bog being given an Unfavourable Inadequate assessment, as their current Area extent is below the Favourable Reference Value. The Area has been given an Increasing trend at 11 raised bogs; Stable at 14 and Decreasing at 19 raised bogs. Fernández et al. (in prep.) have identified a overall Decreasing trend in the 2007-2012 period (6 years) of approximately 1.5%. Thus, the overall Area assessment is Unfavourable Bad-Decreasing. This is likely to continue for some time into the future until the rate of restoration exceeds the rate of loss. Given that following restoration it generally takes a decade for significant areas of Active habitat to form this decline is likely to continue throughout the next reporting period.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	An Unfavourable Bad assessment was given to 35 of the 44 raised bogs (Fernandez et al. (in prep.)) as the area of finest/wettest vegetation quality is more than 25% below Favourable Reference Value. A further 3 were rated as Unfavourable Inadequate (as the extent of finest/wettest vegetation quality is 5% - 25% below Favourable Reference Value), and only 6 were rated as Favourable (as the extent of both central and active flush ecotopes within the bog is higher than Favourable Reference Value. The Structure & Functions have been given a Stable trend at 29 raised bogs (no variation in the vegetation quality); Declining at 8, which implies that vegetation quality has declined in the reporting period and Improving at 7 raised bogs, which implies that vegetation quality has improved in the reporting period. Therefore the overall assessment of Structure & Functions is Unfavourable Bad - Stable.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Active Raised Bog Structure & Functions were assessed as Unfavourable Bad in 2007. The assessment was based on the variation in central ecotope extent in the reporting period within the 48 raised bogs assessed. These bogs accounted for 51.27% of the Active Raised Bog national resource in 2007. 20 raised bogs were given an Unfavourable Inadequate assessment as the extent of central ecotope decreased between 5-25%; 6 an Unfavourable Bad assessment as the central ecotope extent decrease was greater than 25% and 12 a Favourable assessment as there was no variation in central ecotope extent. The decline in habitats Structure & Functions was associated with drying out processes on the high bog caused by impacting activities, mainly peat cutting and drainage (both on the high bog and adjacent to the high bog). The new assessment shows a very slight (0.60ha) variation in the extent of central and active flush ecotopes in the 44 raised bogs assessed by Fernandez et al. (in prep.). 43 of these 44 raised bogs are SACs. The report highlights the more positive assessment in this new reporting period, resulting from a declining trend in negatively impacting activities and positive results of restoration works within SACs, as confirmed by the small decline in habitat Area (1.61% (ca 13.5ha) in the 2004/05-2011/13 period). However, a different and more negative scenario is envisaged in NHA raised bogs and undesignated sites.

Field label	Note
Habitat code: 7110	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Fernandez et al. (in prep.) gave a negative assessment at 35 of the 44 raised bogs which were surveyed in 2011-2012: UB-Declining at 26 raised bogs and UI-Stable at 9 raised bogs, and a positive assessment at 9 sites: F-Stable at 2 raised bogs and F-Improving at 7 raised bogs. The Active Raised Bog habitat within the sites assessed (822.49ha) account for 42.07% of the Active Raised Bog national resource (1,955ha). According to Fernandez et al. (in prep.) a very similar scenario is expected in the remaining raised bog SACs. The overall habitat extent within SACs is 1,400ha, which accounts for 71.61% of the national habitat resource. Impacts from negatively impacting activities have been successfully reduced within SACs and the benefits from positive management actions (i.e. peat cutting cessation scheme, restoration programs) have also been particularly positive, as highlighted by the much smaller reduction in habitat losses compared to the previous reporting period. However, the situation is much more negative for the habitat in NHA raised bogs, as well as in the small proportion of the habitat remaining within non-designated sites, which together hold 28.39% of the habitats national resource. According to Fernandez et al. (in prep.), in spite of positive actions being undertaken, damaging activities continue impacting on raised bog SACs. Furthermore, although the Future Prospects are more positive within SACs, the Future Prospects for raised bog NHAs and non-designated raised bogs are much more negative, as negatively impacting activities are expected to have had either a stable or increasing trend within them. Therefore, overall Active Raised Bog Future Prospects are given an Unfavourable Bad - Declining assessment.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Fernandez et al. (in prep.) highlighted the difference between future prospects for those habitats areas within SACs and those within NHAs and non-designated sites. Within SACs a decreasing trend has been given to peat cutting due to the successful implementation of the Department of Arts, Heritage and Gaeltacht's peat cutting cessation scheme. Drainage, reported along with peat cutting as being the main negatively impacting activity, has also been slightly reduced on the high bog within SACs as a result of restoration works. But adjacent land drainage is being regularly maintained and thus its impact trend remains stable. Forestry on the high bog has a decreasing trend as several conifer plantations have been removed as part of restorations works. These restoration works included cutover plantations on some occasions. Fire events seem to have been reduced in frequency within SACs. Fernandez et al. (in prep.) also mentioned the low frequency but high potential impact of quarrying activities near SAC raised bogs. Despite the decreasing trend of some negatively impacting activities, peat cutting and/or drainage, in particular, continue impacting on most SACs and these impacts will not cease until turf cutting stops completely and all impacting drains are successfully blocked. Much more negative future prospects are envisaged to those raised bogs within NHAs and non-designated sites, as the current Department of Arts, Heritage and the Gaeltacht's peat cutting cessation scheme does not apply to these sites.In addition fewer restoration works have been undertaken or are planned on NHAs or non-designated sites which could offset likely ongoing losses .

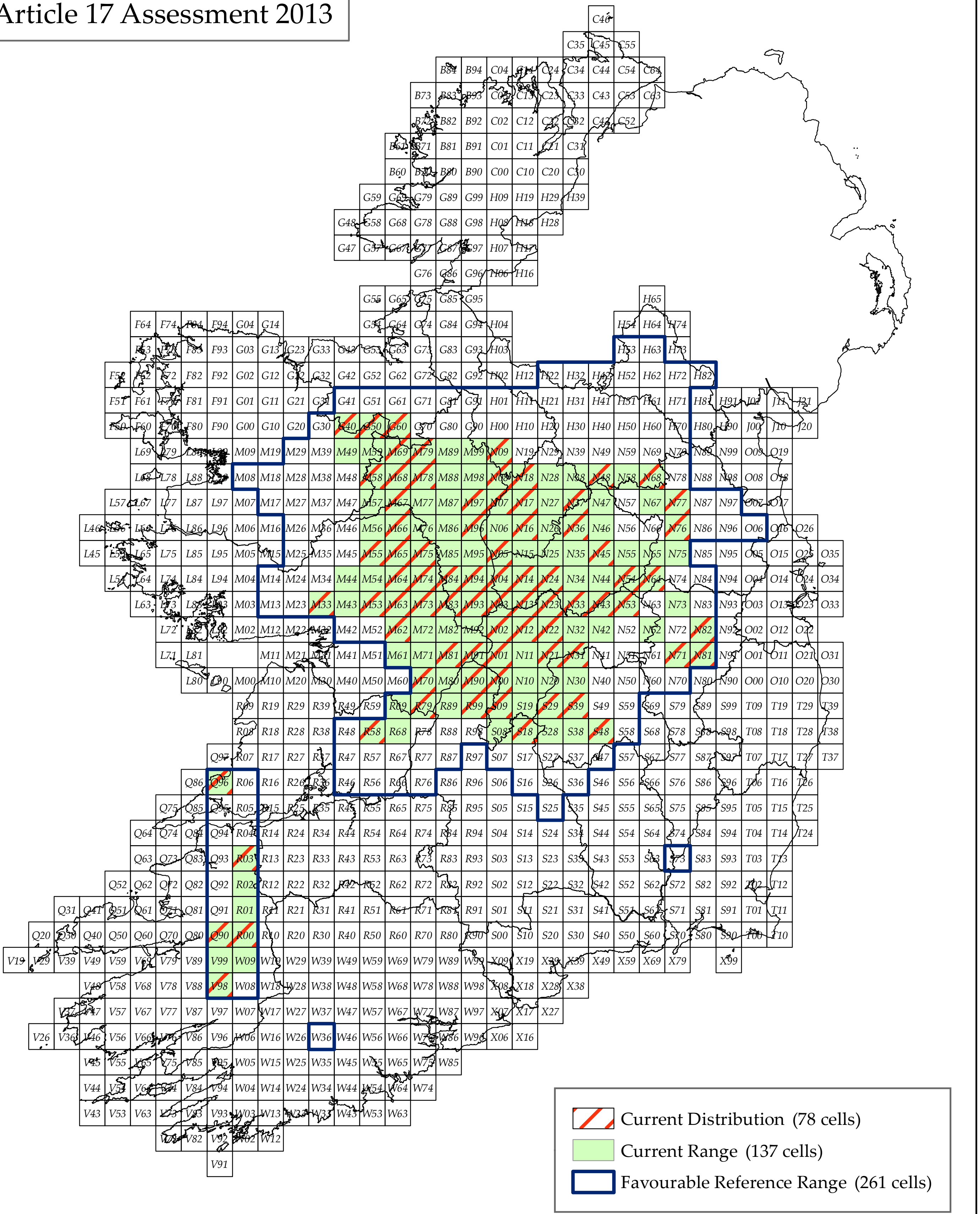
Habitat code: 7110

Field label	Note
2.8.05 Overall assessment of Conservation Status	Fernandez et al. (in prep.) gave an Unfavourable Bad overall conservation status assessment at all 44 raised bogs assessed, as their current individual habitat's Area is below Favourable Reference Value. These bogs contain 42.07% of the national resource of the habitat. The overall habitat trend has been assessed as Improving at 8 raised bogs; Stable at 7 raised bogs and Declining at 29 raised bogs. The overall current habitat Area value is 76.78% below target (i.e. Area Favourable Reference Value) and the current Structure & Functions value (i.e. central and active flush area) is 35.35% below target (i.e. Structure & Functions Favourable Reference Value). An increase in the habitat's Area has been reported in the 8 sites given an Improving trend. This has been coupled by an improvement in Structure & Functions in the majority of these sites and Favourable- Improving Future Prospects have also been given to most of them. Restoration works were undertaken in the 7 of the 8 sites given an Improving trend and they are also characterised by the lack of highly negatively impacting activities (i.e. peat cutting and drainage). A Stable trend was given to raised bogs (7) where all three attributes (Area, Structure & Functions and Future Prospects) were stable. None of the sites have a negatively impacting activity given a High Importance/Impact. Restoration works took place in 3 of the 7 bogs given this assessment. However, no improvements in the habitat were noted in the reporting period (2007-2012). 19 of the 29 raised bogs given a Declining trend have seen a decrease and/or decline in habitats' Area and/or Structure & Functions as a result of highly negatively impacting activities (i.e. peat cutting and drainage). Restoration works, some of them with limited success, were undertaken at 11 of these 29 raised bogs. However, impacting activities continue counteracting their positive results. Although no variation in the habitats' Area and Structure & Functions have been reported for 7 of the 29 raised bogs, impacting activities (i.e. peat cutting and drainage) seriously compromise the habitats Future Prospects and thus their potential to achieve favourable conservation status. Active Raised Bog habitat was given an overall Unfavourable Bad-Declining assessment, based on the extrapolation of Fernandez et al. (in prep.) results.

Field label	Note
Habitat code: 7110	
2.8.06 Overall trend in Conservation Status	In spite of the negative result, the assessment undertaken by Fernandez et al. (in prep.) has shown that Future Prospects are much more positive for the habitat within SAC designations, which accounts for 71.61% of the national habitat resource, compared to the remaining resource included in NHAs and non-designated sites. The small decrease (1.6% (ca 13.5ha)) in the habitat's area within the sites assessed (43 SACs out of 44 raised bogs surveyed) compared to previous 2007 assessment (36.8%) (NPWS, 2008) confirms this more positive, but still declining, trend within SAC raised bogs. This improvement has occurred largely as a result of the turf cutting cessation schemes and the implementation of restoration programs over the last two decades. The effective reversal of this declining trend and the restoration of the habitat to favourable status will need the cessation of damaging peat cutting at sites where the Active raised bog habitat is found as well as the implementation of a targeted and properly resourced restoration program.. The establishment of such a restoration program is expected to be one of the outputs of the recently initiated Department of Arts, Heritage and Gaeltacht national raised bog conservation program. This program will also establish more accurate Favourable Reference Values for habitat Area, based on topographical and hydrological studies of raised bog hydrological units, including both high bog and cutover areas. Fernandez et al. (in prep.) also highlighted the need for a effective protection of NHA raised bogs to preserve all the habitat's ecological variations and thus the habitat's Range. There is also need for impact assessments of those activities adjacent to the high bog such as the insertion of peripheral drainage, drainage maintenance (e.g. dredging of adjacent streams and rivers), new forestry plantations, and quarrying which could affect the hydrology of the bog basin and therefore the potential for restoration.
3.1.01 a) Surface area - Minimum	The overall habitat extent within SACs is 1,400ha, which accounts for 71.61% of the national habitat resource.
3.1.01 b) Surface area - Maximum	See 3.1.1 a)
3.1.02 Method used	This is based on the intersection of habitat distribution data with the NPWS SAC distribution layer.
3.1.03 Trend of surface area within the network	In the current reporting period (2007-2012) Fernandez et al. (in prep.) found that the raised bog habitats within SACs are being protected more effectively than they were in the previous reporting period and that theyare better protected than those outside SACs (i.e. those in NHA designations and non-designated sites). This is mainly as a result of the implementation of the new Department of Arts, Heritage and Gaeltacht peat cutting cessation scheme, which applies only to SACs and also due to the larger number of restoration works which have been undertaken within SACs. Although a separate national assessment has not been given to those habitats areas outside or inside the SAC network, Fernandez et al. (in prep.) results highlighted that those habitats samples outside the SAC designation network are likely to have suffered a larger decrease in habitat Area, a higher decline in habitat's Structure & Functions and are likely to have more negative Future Prospects than those designated within SACs. Nevertheless, highly negatively impacting activities (i.e. peat cutting and drainage) also continue to affect raised bog SACs.

Field label	Note
Habitat code: 7110	
3.2 Conservation measures	Fernandez et al. (in prep.) highlighted the very positive results of the two main conservation measures employed by the Department of Arts, Heritage and Gaeltacht in the protection of the raised bog habitats within SACs. Firstly, the peat cutting cessation scheme has considerably reduced, particularly in 2012, the number of plots being cut and in some cases appears to have lead to the complete cessation of peat cutting activity. Meanwhile, the raised bog restoration program initiated in the 1990's, and its sucessors, have resulted in the development of new Active Raised Bog habitat areas in many sites and/or reversed a decreasing Active Raised Bog habitat trend in other sites. Restoration works have been undertaken and planned for the future by the NPWS, Coillte and Bord Na Móna The recent initiation of a national raised bog conservation program by The Department of Arts, Heritage and Gaeltacht, is a very positive step towards more effective conservation of raised bog habitats and to the eventual achievement of favourable conservation status. The current program aims to develop national and site specific habitat conservation objectives, to develop a National Raised Bog SAC Management Plan, to prepare draft hydrological / restoration plans for the SACs and compensatory sites, to identify priorities for undertaking works and to facilitate the implementation of the subsequent restoration program. This program will be developed in 2013/14.

Raised Bog (Active) (7110)
Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7120

NAME: Degraded raised bogs still capable of natural regeneration

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published:

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., Connolly K., Crowley W., Denyer J., Duff K. & S, Smith G. (in prep.) Raised Bog Monitoring Project 2013. Irish Wildlife Manuals, No XX. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-5, Unpublished report, National Parks & 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.

Fernandez, F. Crowley, W. & Wilson S. (2009a) Clara Bog (Clara, Co. Laois) High Bog Ecological Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Fernandez, F. Crowley, W. & Wilson S. (2009b) Killamuck Bog (Abbeyleix, Co. Laois) High Bog Ecological Survey, Bord Na Móna, Dublin.

Fernandez, F. Crowley, W. & Wilson S. (2012) Raised Bog Monitoring Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Moore, P.D. & Bellamy, D.J. (1974) Peatlands. Elek Science, London. 221pp.

Kelly, L. (1993) Hydrology, Hydrochemistry and Vegetation of Two Raised Bogs in Co. Offaly, Ph.D. thesis, Trinity College Dublin.

Kelly, L. Doak, M. and Dromey, M. (1995) Raised Bog Restoration Project, an investigation into the conservation and restoration of selected raised bog sites in Ireland. Internal report to the National Parks and Wildlife Service, 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.

NPWS (2008) The Status Of EU Protected Habitats And Species In Ireland. Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of the Environment, Heritage

and Local Government. Dublin.
Schouten, M.G.C. (1984) Some aspects of the ecogeographical gradient in the Irish ombrotrophic bogs, paper presented to 7th Int. Peat Congress, Dublin, vol. 1, pp. 414-432, The International Peat Society, Helsinki.
White, J. and Doyle, G. (1982) The vegetation of Ireland: a catalogue raisonne. J. Life Sci. 3: 289 – 268.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	26100	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	26100
	operator	N/A
	unknown	No
	method	According to Fernandez et al. (in prep.), Favourable Reference Range is considered to correspond with the current Range of Degraded Raised Bog habitat. Although the objective is to restore Degraded Raised Bog to Active Raised Bog habitat (7110), many areas of Degraded Raised Bog (7120) may not be capable of regeneration, particularly those areas highly modified by impacting activities (i.e. peat cutting and drainage) due to their topographical and hydrological conditions which makes them unsuitable to support Active Raised Bog (7110). Thus, even if the area of Degraded Raised Bog diminishes through improvement, the current Range and Favourable Reference Range would be the same.
2.3.10 Reason for change	Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	479.78				
2.4.2 Year or period	1994-2012				
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)				
2.4.4 Short-term trend period	2001-2012				
2.4.5 Short-term trend direction	increase (+)				
2.4.6 Short-term trend magnitude	min	0.5	max	1	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.8 Long-term trend period					
2.4.9 Long-term trend direction	N/A				
2.4.10 Long-term trend magnitude	min		max		confidence interval
2.4.11 Long term trend method used	N/A				
2.4.12 Favourable reference area	area (km)	284.91			
	operator	N/A			
	unknown	No			
	method	The habitat's Favourable Reference Value was calculated based on the difference between national "intact" high bog resource			

(50,011ha) and the Favourable Reference Value for Active Raised Bog habitat (21,520ha) (Fernandez et al. in prep.). Although significant areas of Degraded Raised Bog may not be suitable for restoration, their conservation will often be important to ensure the hydrological integrity of areas of high bog and to support areas of Active Raised Bog. Degraded Raised Bog has also an ecological value on its own and as peat archive (i.e. ecological and archaeological information). Though less effective than Active raised bog they are also important in regulating the hydrological cycle as they retain and filter water and act as a store for carbon.

2.4.13 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
fire and fire suppression (J01)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
grazing (A04)	low importance (L)	N/A
motorised vehicles (G01.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
fire and fire suppression (J01)	medium importance (M)	N/A
Mining and quarrying (C01)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
grazing (A04)	low importance (L)	N/A
motorised vehicles (G01.03)	low importance (L)	N/A

2.6.1 Method used – threats	modelling (2)

2.7 Complementary Information

2.7.1 Species

Andromeda polifolia
Drosera anglica
Drosera intermedia
Drosera rotundifolia
Eriophorum angustifolium
Eriophorum vaginatum
Menyanthes trifoliata
Narthecium ossifragum
Rhynchospora alba
Utricularia minor
Vaccinium oxycoccos
Aulacomnium palustre
Campylopus atrovirens
Leucobryum glaucum
Pleurozia purpurea
Racomitrium lanuginosum
Sphagnum austinii
Sphagnum capillifolium
Sphagnum cuspidatum
Sphagnum denticulatum
Sphagnum fuscum
Sphagnum magellanicum
Sphagnum papillosum
Sphagnum pulchrum
Sphagnum subnitens
Cladonia ciliata
Cladonia portentosa

2.7.2 Species method used

Species list is based on vegetation communities defined by Kelly (1993) and Kelly and Schouten (2002). These vegetation communities were used to map the extent of ecotopes on the ground by Fernandez et al. (2005), Fernandez et al. (2012) and Fernandez et al. (in prep.). The typical species were derived from the best quality vegetation types. This includes vascular plants, bryophytes and lichens (Cladonia spp.). Although typical species were not directly used to assess the habitat's Structure & Functions conservation status, the Structure & Functions assessment was based on the variation in the extent of best quality vegetation (ecotopes). Good quality species indicators, also included in the typical species list, are found within the best quality ecotope types (particularly certain Sphagnum spp.).
A similar typical species list has been assigned to both Active Raised Bog habitat (7110) and Degraded Raised Bog habitat (7120). However, the frequency of species would vary between both habitats.

2.7.3 Justification of % - thresholds for trends	Degraded Raised Bog is anomalous as a reduces area is desirable, if, and only if this is the result of losses caused by the development of new Active Raised Bog habitat (7110). An increasing trend in Degraded Raised Bog habitat as a result of Active Raised Bog losses is taken as being negative.
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	103.68	max	103.68
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving the hydrological regime (4.2)	Legal Administrative Contractual	high importance (H)	Both	Enhance Long term
Other wetland-related measures (4.0)	Legal Administrative Contractual	high importance (H)	Both	Enhance Long term

Field label	Note
Habitat code: 7120	
0.1 Member State	Ireland
0.2 Habitat code	Raised bogs are accumulations of deep acid peat (3-12m) 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 (Fossit, 2000). The bog dome is primarily rainwater fed (ombrotrophic mire) and isolated from the local groundwater table. This gives rise to acidic conditions deficient in plant nutrients and in turn supports a distinctive suite of vegetation types, which although low in overall diversity, support specialised plant assemblages dominated by a range of mosses of the genus Sphagnum. The mire expanse 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. However, although Degraded Raised Bog may contain a similar species selection to Active Raised Bog, the relative abundance of individual species is different, with a lower Sphagnum spp. Cover. Irish raised bogs are classified as Oceanic raised bog mire (sensu 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 raised bog that is still hydrologically intact is assigned to the Oxycocco-Sphagnetea and to the Erico-Sphagnetum magellanici phytosociological association (White and Doyle, 1982). 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 in land below 130m. Irish raised bogs 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 1,000mm isohyet. Degraded Raised Bog is characterised by the complete absence of (or a patchy thin cover) of an acrotelm layer, which is defined as the living, actively growing upper layer of a raised bog. The presence of the acrotelm is vital to a raised bog as this is the peat forming layer and water storing layer of the bog. In an Irish context, Degraded Raised Bog, which is currently only defined as found on the high bog, encompasses sub-marginal, marginal and face bank ecotopes, defined by Kelly (1993) and Kelly and Schouten (2002) as well as inactive flushes and dry woodland. Depressions on peat substrates of the Rhynchosporion (7150) are also found within Degraded Raised Bog habitat (7120). The actual definition of the habitat (still capable of regeneration), indicates that the habitat can be restored to Active Raised Bog habitat (7110). In the Irish context, the habitat does not include secondary degraded raised bog which relates to highly drained high bog devoid of vegetation, cutaway, and cutover bog. Although such areas do not correspond with the strict definition of Degraded Raised Bog within the Habitats Directive Interpretation Manual, the re-establishment of vegetation with peat forming capability in these areas may be possible and it may be even more feasible to restore some of these areas to active bog than some areas of typical Degraded Raised Bog.
1.1.01 Distribution map	This map represents the map referred to in 1.1.4 which has been transformed to the LAEA projection.

Field label	Note
Habitat code: 7120	
1.1.02 Method used - map	Fernandez et al. (in prep.) updated the 2007 habitat distribution map based on data from the most recent raised bog surveys. These include surveys undertaken in 2012-13 (Fernandez et al. in prep.), 2011 (Fernandez et al. 2012) and 2009 (Fernandez et al. 2009a & 2009b). These surveys were undertaken at ecotope level based on Kelly (1993) and Kelly and Schouten (2002) vegetation classification. The map also includes habitat data for those sites for which post 2007 surveys were not undertaken and thus only pre-2007 (1994-2005) detailed habitat (i.e. ecotope) data is available for these sites. These were already reported in 2007. The new habitat distribution map also includes an additional dataset which illustrates “intact” high bog and does not include ecotope data as detailed ecotope surveys have not been undertaken so far. These datasets contains records reported by different sources based on remote sensing data and confirmed on the 2000 Osi aerial photographs. These records correspond with Degraded Raised Bog habitat where the possibilities of finding Active Raised Bog habitat are minute. This dataset was compiled in 2007 as part of NPWS (2008). This dataset includes data from the 2000 to 2006 period, and thus its current extent would be smaller as a result of peat cutting since 2006.
1.1.03 Year or period	1994-2012
1.1.04 Additional distribution map	Habitat data records reported from the listed surveys were used to generate the 10 km distribution map by intersecting each individual habitat record from these sources with the 10km Irish National Grid.
1.1.05 Range map	Range map was derived based on the IT Tool version 10.0 (30/08/2012) generated by ETC/BC.
2 Biogeographical level	ATL
2.1 Biogeographical region or marine regions	ATL

Field label	Note
Habitat code: 7120	
2.2 Published sources	Overview of some of the main publications 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. This project undertook habitat surveys at ecotope level for a selection of 29 raised bogs in the 1999-2000 period. Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & S, Smith G. (in prep.) Raised Bog Monitoring Project 2013. Irish Wildlife Manuals, No XX. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. This project summarised the individual site conservation assessment results for habitats 7110, 7120, 7150 and 91D0 undertaken for a total of 44 raised bogs (43 SACs and 1 NHA) surveyed as part of Fernandez et al. (2012) and this project. The report also includes the assessment of the conservation status of 7110 and 7120 at national level following the Art. 17 EU Habitats Directive reporting guidelines. Fernandez, F., Fanning, M., McCorry, M. & Crowley, W. (2005) Raised Bog Monitoring Project 2004-5, Unpublished report, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. This project summarised the individual site conservation assessment results for raised bog habitats (7110, 7120, 7150 and 91D0) undertaken for a total of 48 raised bogs in the 2004-2005 period. 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. This project assessed the impact of turf cutting in all designated raised bogs (both SACs and NHAs) in Ireland. As part of the project habitat surveys at ecotope level were undertaken for a selection of raised bogs. Fernandez, F. Crowley, W. & Wilson S. (2012) Raised Bog Monitoring Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin. This project summarised the individual site conservation assessment results for raised bog habitats (7110, 7120, 7150 and 91D0) undertaken for a total of 12 raised bogs in 2011.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	See 1.1.2 & 1.1.4.
2.3.03 Short-term trend - Period	Default 2001-2012 trend period was used. This is based on the assessments undertaken by Fernandez et al. (2005) and Fernandez et al. (in prep.). The latest also includes assessments for 5 raised bogs surveyed in early 2013.
2.3.04 Short term trend - Trend direction	Evidence from aerial photographs and field visits (Fernandez et al. (2005), Fernandez et al. (2006) and Fernandez et al. (in prep.)) over the period does not suggest any change in Range. Thus a Stable trend was given.
2.3.10 c) Reason for change - use of different method	The use of the standardised range tool has resulted in a change to the Range compared to 2007.

Field label	Note
Habitat code: 7120	
2.4.01 Surface area	Habitat data is based on a combination of remote sensing data (e.g. satellite images and ortho images) and field surveys for which detail ecotope data is available as compiled and described by Fernandez et al. (in prep.) (See 1.1.2 for list of sources). The habitat consists of three ecotopes (sub-marginal, marginal and face bank), as well as inactive flushes and dry woodland on the high bog. Note that the latter does not correspond with the priority habitat Bog Woodland (91D0). Those habitat records derived from remote sensing data correspond with Degraded Raised Bog habitat for which ecotope data is not available.
2.4.02 Year or period	12.95% of the reported habitat's Area was surveyed during the 2007-2013 period. The remaining 87.05% was recorded in the 1994-2006 period as described by Fernandez et al. (in prep.). The extent of the latter may be smaller as a result of habitat losses due to peat cutting since the data was generated (1994-2006).
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The default 2001-2012 trend period was used. This is based on the assessments undertaken by Fernandez et al. (2005) and Fernandez et al. (in prep.). The latter includes assessments for 5 raised bogs surveyed in early 2013. The inclusion of data from these sites is acceptable as no significant change in area of Degraded bog will have occurred in the short time between the end of the 2012 reporting period and the survey.
2.4.05 Short-term trend - Trend direction	An overall Increasing trend has been given for the 2001-2012 period. This is based on an approximate 8% increase (ca 533ha), reported by Fernandez et al. (2005) for 48 raised bog assessed in the 1994/95-2004/05 period, and a 0.5% decrease (ca 32ha) reported by Fernandez et al. (in prep.) in the 2004/05-2011/13 period for 44 bogs. The 533ha increase in the first period consisted of a 581ha increase in habitat extent due to losses of Active Raised Bog habitat and ca 48ha of decrease due to high bog losses caused by peat cutting. In the current period the 32ha decrease consists of a 45ha high bog loss due to peat cutting and approximately 13.5ha increase due to losses of Active Raised Bog habitat. Both Fernandez et al. (2005) and Fernandez et al. (in prep.) estimated an overall 1% decrease in high bog due to peat cutting.
2.4.06 a) Short-term trend - Magnitude - Minimum	Following the rationale outlined in 2.4.5 the minimum estimate for the 2001-2012 period is a 0.5% increase in the area of Degraded Raised Bog.
2.4.06 b) Short-term trend - Magnitude - Maximum	Following the rationale outlined in 2.4.5 the maximum estimate for the 2001-2012 period is a 1% increase in the area of Degraded Raised Bog.
2.4.07 Short-term trend - Method used	See 2.4.5
2.4.13 a) Reason for change - genuine change?	Yes
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Some differences in value are due to more accurate data.

Field label	Note
Habitat code: 7120	
2.5 Main pressures	Pressures were recorded at each raised bog surveyed by Fernandez et al. (in prep.). Although it was not possible to estimate the proportion of the habitat impacted by each activity, these were ranked according to their level of Importance/Impact as High; Medium and Low. A high Importance/Impact indicates that the habitat's Area and/or Structure and Functions have been directly or indirectly impacted on by the activity in the reporting period. A total of 11 different pressure types were reported. All but Restoring/Improving the hydrological regime (4.2) and Forestry clearance (B02.02) were considered to have a negative impact on the habitat. These include, ranked by level of importance, the following: Drainage (J02.07) both on high bog and adjacent to high bog; Peat extraction (C01.03); Artificial planting on open ground (non-native trees) (B01.02) both on high bog and adjacent to high bog; Fire (J01); Quarrying (C01); Invasive alien (I01); Problematic native (I02); Grazing (A04); motorised vehicles (G01.03). NPWS Site Inspection Form was also consulted but no additional information on new highly impacting activities beside those already reported Fernandez et al. (in prep.) was obtained.
2.5.01 Method used - pressures	See 2.5.
2.6 Main threats	Fernandez et al. (in prep.) found that, within SACs there was a decrease in pressures from Peat cutting C01.03); Drainage (J02.07); Artificial planting on open ground (non-native trees) (B01.02) on the high bog and Fire (J01). The remaining activities were given a stable trend. A different scenario for raised bogs NHAs and non-designated raised bogs was reported, where no decline in the reported pressures was identified. Despite the decline in some pressures within SACs, the list of threats is the same as the one for pressures.
2.6.01 Method used - Threats	See 2.6.
2.7.02 Typical species - method used	The species list is based on vegetation communities defined by Kelly (1993) and Kelly and Schouten (2002). These vegetation communities were used to map the extent of ecotopes on the ground by Fernandez et al. (2005) and Fernandez et al. (in prep.). The typical species were derived from the best quality vegetation types. This includes vascular plants, bryophytes and lichens (Cladonia spp.). Although typical species are not directly used to assess the habitat's Structure & Functions conservation status, the Structure & Functions assessment is based on the variation in the extent of best quality vegetation (ecotopes). Good quality species indicators, also included in the typical species list, are found within the best quality ecotope types (particularly certain Sphagnum spp.). A similar typical species list has been given to both Active Raised Bog habitat (7110) and Degraded Raised Bog habitat (7120). However, their frequency would vary between both habitats.
2.7.04 Structure and functions - Methods used	The Structure & Functions assessment for the habitat is based on the extrapolation of the results of the individual site assessments undertaken by Fernandez et al. (in prep.) at 44 raised bogs, which contain 12.95% of the national habitat resource, surveyed in the 2011-2013 period. The vegetation surveys at these 44 bogs were undertaken at the ecotope level based on Kelly (1993) and Kelly and Schouten (2002) vegetation types. Data from these surveys was compared to similar data for these 44 raised bogs from Fernandez et al. (2005) (43 raised bogs) and Derwin, J. & MacGowan, F. (2000) (1 raised bog). The assessment was based on the variation in the most degraded vegetation types (marginal and face bank ecotope) in the reporting period. An increase in their extent indicates a decline in habitat's Structure & Functions. Typical species were not closely monitored and their assessment is based on the variation of the most degraded ecotopes where good quality indicator species are less abundant.

Field label	Note
Habitat code: 7120	
2.7.05 Other relevant information	The overall habitat extent within SACs is 10,368ha, which accounts for 21.61% of the national habitat resource (47,978ha). 9,573ha (92.33%) of the habitat is listed as qualifying interest within 53 SACs. The remaining 795ha (7.67%) is located within SACs for which the habitat is not listed as qualifying interest.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Both current and Favourable Reference Range are considered to be the same. The habitat current Range is considered to cover all significant ecological variations of the habitat and to be sufficiently large enough to allow the long term survival of the habitat. The ETC/BD Tool has now been used to calculate the Range. There has been no change in the extent of the Range in the reporting period. However, as noted for the reasons given in 2.3.9 d) the Area value given may be an overestimate.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	The habitat has been given a Stable trend. No variation in habitat Range was reported since 2007.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current habitat Area (47,978ha) is 69.44% above the Favourable Reference Area (28,315 km2). This value was based on the difference between the national "intact" high bog resource (50,011ha) and the Favourable Reference Value for Active Raised Bog Area (21,520ha). Degraded Raised Bog habitat is a special case since if restored (which is the goal) it becomes Active Raised Bog habitat and thus the Favourable Reference Area is less than the present day area. Both Favourable Reference Value are only approximate until further hydrological and topographical studies provide more accurate data on the area which can be potentially be restored.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	According to Fernandez et al. (in prep.), the habitat's Area has been assessed as Unfavourable Bad at 42 of the 44 raised bogs assessed and Unfavourable Inadequate at 2 raised bogs. The Area has been given a Stable trend at 6 raised bogs; Increasing trend at 12 raised bogs (as a result of drying out processes associated with peat cutting and/or drainage converting Active into Degraded habitat) and Decreasing at 26 raised bogs (peat cutting caused a decrease in habitat extent at 20 of these bogs; while in the other 6 bogs the decrease was as a result of an increase in Active raised Bog habitat and is thus taken as a positive trend). Fernandez et al. (in prep.) reported approximately 45ha (0.72%) of habitat loss corresponding with high bog loss due to peat cutting in the 2004-2010 period within the 44 raised bogs assessed. They have identified an overall Decreasing trend in the 2007-2012 period (6 years) of approximately 1%. Thus, the overall Area assessment is Unfavourable Bad-Decreasing. This is likely to continue in the future, due especially to turf cutting in NHAa and undesignated
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	A Favourable - Improving assessment was given to 10 of the 44 raised bogs by Fernandez et al. (in prep.). This indicates an overall decrease in the more degraded ecotopes (marginal and face bank) as a result of restoration works at these bogs. A Favourable - Stable assessment was given to 12 bogs, as a 0-5% variation in marginal and face banks ecotope took place on these sites in the reporting period. An Unfavourable Bad - Declining assessment was given to the remaining 22 bogs: peat cutting has been described as having a High impact on the habitat at all these bogs. Therefore the overall assessment of Structure & Functions is Unfavourable Inadequate - Declining.

Field label	Note
Habitat code: 7120	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Degraded Raised Bog Structure & Functions were assessed as Unfavourable Inadequate in 2007. The assessment was based on the variation in marginal ecotope extent in the reporting period within 48 raised bogs assessed. These bogs accounted for 12.95% of the Degraded Raised Bog national resource in 2007. 13 raised bogs were assessed as Unfavourable Inadequate assessment which implies an increase in marginal ecotope between 5 and 25%; 6 Unfavourable Bad which indicates increases in marginal ecotope extent greater than 25%; and 29 as Favourable due to small variations in the extent of marginal ecotope (<5%). The decline in habitat Structure & Functions was associated with drying out processes on the high bog caused by impacting activities, mainly peat cutting and drainage (both on the high bog and adjacent to the high bog). The new assessment shows a very similar result (Unfavourable Inadequate – Declining). Although Fernandez et al. (in prep.) reported a declining trend in negatively impacting activities (including peat cutting) and positive results of restoration works within the 44 raised bogs assessed, peat cutting took place at 32 of these raised bogs in the reporting period and had a negative impact on the habitat.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Fernandez et al. (in prep.) gave a negative assessment at 35 of the 44 raised bogs which were surveyed: UB-Declining at 23 raised bogs, UI-Declining at 3 raised bogs and UI-Stable at 9 raised bogs; and a positive assessment in 9 raised bogs: 1 raised bog F-Stable and 8 F-Improving. The Degraded Raised Bog habitat within the sites assessed (6,215ha) accounts for 12.95% of the Degraded Raised Bog national resource (47,978ha). A very similar scenario is expected in the remaining raised bog SACs. The overall habitat extent within SACs is 10,368ha, which accounts for 21.61% of the national habitat resource. Impacts from negatively impacting activities have been successfully reduced within SACs and the benefits from positive management actions (i.e. peat cutting cessation scheme and the restoration programs) have been also particularly positive. However, in spite of positive actions being undertaken, damaging activities continue impacting on raised bog SACs. Furthermore, although the Future Prospects are more positive within SACs, the Future Prospects for raised bog NHAs and non-designated raised bogs are much more negative, as negatively impacting activities are expected to have had either a stable or increasing trend within them, and thus Degraded Raised Bog Future Prospects are given an Unfavourable Bad - Declining assessment.

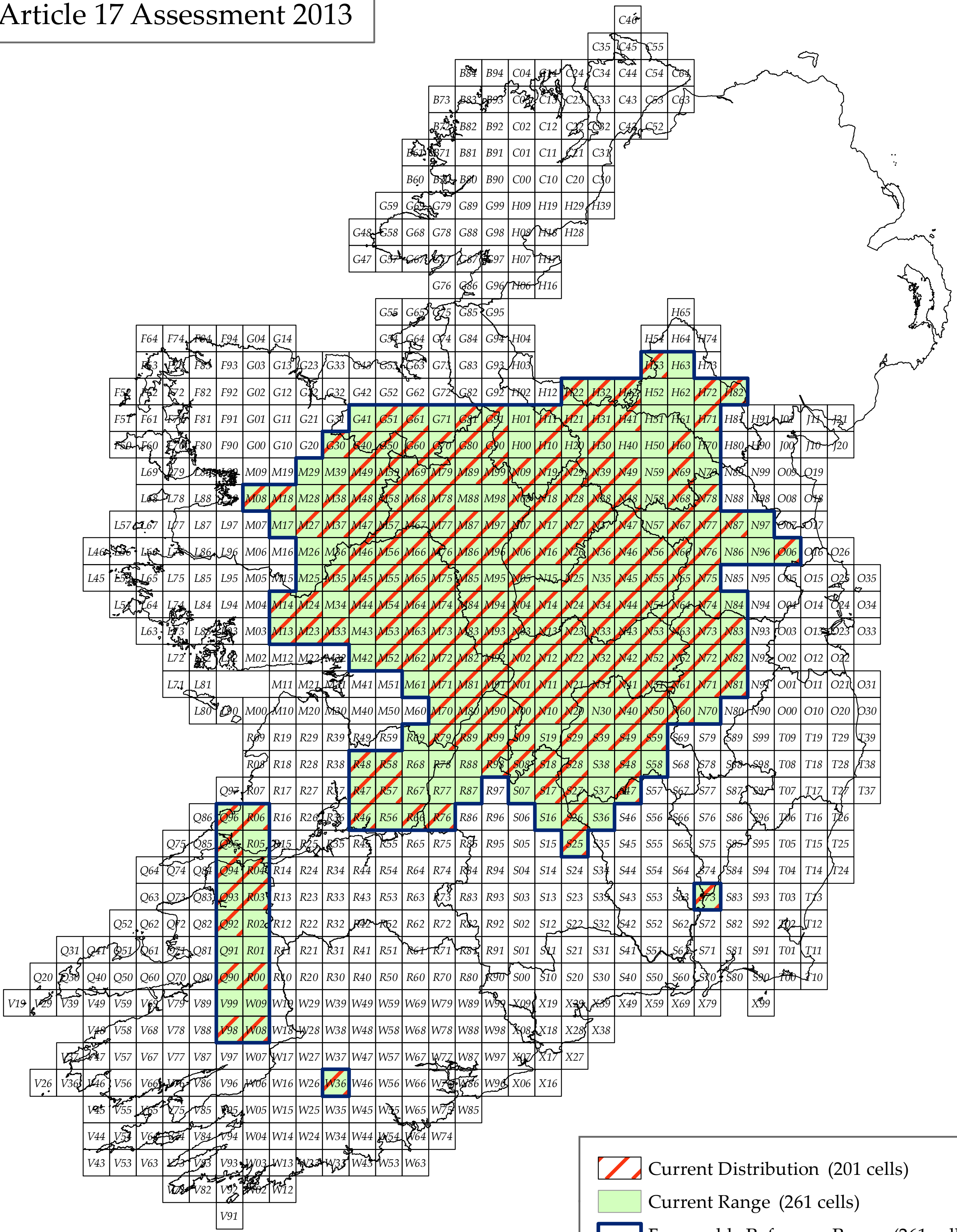
Field label	Note
Habitat code: 7120	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Fernandez et al. (in prep.) highlighted the difference between future prospects for those habitats areas within SACs and those within NHAs and non-designated sites. Within SACs a decreasing trend has been assigned to peat cutting due to the successful implementation of the Department of Arts, Heritage and Gaeltacht's peat cutting cessation scheme. Drainage, which with peat cutting is the main negatively impacting activity, has also been slightly reduced on the high bog within SACs as a result of restoration works. But adjacent land drainage is being regularly maintained and thus its impact trend remains stable. Forestry on the high bog has a decreasing trend as several conifer plantations have been removed as part of restorations works. These restoration works included cutover plantations on some occasions. Fire events seem to have reduced in frequency within SACs. Fernandez et al. (in prep.) also mentioned the low frequency but high potential impact of quarrying activities near SAC raised bogs. Despite the decreasing trend of some negatively impacting activities, peat cutting and/or drainage, in particular, continue impacting on most SACs and these impacts will not cease until turf cutting stops completely and all impacting drains are successfully blocked.. Much more negative future prospects are envisaged to those raised bogs within NHAs and non-designated sites, as the current peat cutting cessation scheme does not apply to these sites. In addition fewer restoration works have been undertaken or are planned on NHAs or undesignated sites.
2.8.05 Overall assessment of Conservation Status	43 of the 44 raised bogs surveyed during 2011-2013 were assessed as Unfavourable Bad, as their current Area is more than 15% above Favourable Reference Value. An Unfavourable Inadequate rating was assigned to 1 raised bog, as its current Area is 5%- 15% above Favourable Reference Value. These bogs contain 12.95% of the habitat's national area. The overall habitat trend is assessed as Improving at 8 raised bogs; Stable at 4 raised bogs and Declining at 32 raised bogs. The overall current habitat Area value is 77.93% above target (i.e. Area Favourable Reference Value). An Improving trend indicates either a decrease in Area as a result of the development of Active Raised Bog habitat or an improvement of Structure & Functions (i.e. increase in sub-marginal ecotope). Restoration works were undertaken at all eight raised bogs given an overall Improving trend. A Stable trend indicates no variation in Area or Structure & Functions, and Stable Future Prospects. Restoration works of a minor nature were undertaken at one of the 4 bogs given this assessment and none of the negatively impacting activities were given a High Importance/Impact on any of these sites. 21 of the 32 raised bogs given an overall habitat Declining trend have lost habitat due to peat cutting. An Increase in Degraded habitat Area was determined in the other 11 raised bogs as a result of drying out processes associated with peat cutting and drainage. Although restoration works, some of them with limited success were undertaken at 10 of these 32 raised bogs, impacting activities continue counteracting their positive results. Based on these results the Degraded Raised Bog habitat was given an overall Unfavourable Bad-Declining assessment.

Field label	Note
Habitat code: 7120	
2.8.06 Overall trend in Conservation Status	The assessment process showed that Future Prospects are much more positive for the habitat within SACs, which accounts for 21.61% of the national habitat resource, compared to the remaining resource included in NHAs and non-designated sites. The small decrease (1.6% (ca 13.5ha)) in the Active Raised Bog habitat area within the sites assessed (43 SACs out of 44 raised bogs surveyed) compared to previous assessment (36.8%) (NPWS, 2008) confirms this more positive, but still declining, trend within SAC raised bogs. This improvement has occurred largely as a result of the turf cutting cessation schemes and the implementation of restoration programs over the last two decades. The effective reversal of this declining trend is a target of the recently initiated Department of Arts, Heritage and Gaeltacht national raised bog conservation program. This program will also establish more accurate Favourable Reference Values for habitat Area, based on topographical and hydrological studies of raised bog hydrological units, including both high bog and cutover areas. There is also need for impact assessments of those activities adjacent to the high bog such as the insertion of peripheral drainage, drainage maintenance (e.g. dredging of adjacent streams and rivers), new forestry plantations, and quarrying which could affect the hydrology of the bog basin and therefore the potential for
3.1.01 a) Surface area - Minimum	The overall habitat extent within SACs is 10,368ha, which accounts for 21.61% of the national habitat resource.
3.1.01 b) Surface area - Maximum	See 3.1.1 a)
3.1.02 Method used	This is based on the intersection of habitat distribution data with the NPWS SAC distribution layer.
3.1.03 Trend of surface area within the network	In the current reporting period (2007-2012) Fernandez et al. (in prep.) found that the raised bog habitats within SACs are being protected more effectively than they were in the previous reporting period and that theyare better protected than those outside SACs (i.e. those in NHA designations and non-designated sites). This is mainly as a result of the implementation of the new Department of Arts, Heritage and Gaeltacht peat cutting cessation scheme, which applies only to SACs and also due to the larger number of restoration works which have been undertaken within SACs. Although a separate national assessment has not been given to those habitats areas outside or inside the SAC network, Fernandez et al. (in prep.) results highlighted that those habitats samples outside the SAC designation network are likely to have suffered a larger decrease in habitat Area, a higher decline in habitat's Structure & Functions and are likely to have more negative Future Prospects than those designated within SACs. Nevertheless, highly negatively impacting activities (i.e. peat cutting and drainage) also continue to affect raised bog SACs.

Habitat code: 7120

Field label	Note
3.2 Conservation measures	Fernandez et al. (in prep.) highlighted the very positive results of the two main conservation measures employed by the Department of Arts, Heritage and Gaeltacht in the protection of the raised bog habitats within SACs. Firstly, the peat cutting cessation scheme has considerably reduced, particularly in 2012, the number of plots being cut and in some cases appears to have lead to the complete cessation of peat cutting activity. Meanwhile, the raised bog restoration program initiated in the 1990's, and its successors, have resulted in the development of new Active Raised Bog habitat areas in many sites and/or reversed a decreasing Active Raised Bog habitat trend in other sites. Restoration works have been undertaken and more are planned for the future by the NPWS, Coillte and Bord Na Móna The recent initiation of a national raised bog conservation program by The Department of Arts, Heritage and Gaeltacht, is a very positive step towards more effective conservation of raised bog habitats and to the eventual achievement of favourable conservation status. The current program aims to develop national and site specific habitat conservation objectives, to develop a National Raised Bog SAC Management Plan, to prepare draft hydrological / restoration plans for the SACs and compensatory sites, to identify priorities for undertaking works and to facilitate the implementation of the subsequent restoration program. This program will be developed in 2013/14.

Degraded Raised Bog (7120)
Article 17 Assessment 2013



Current Distribution (201 cells)

Current Range (261 cells)

Favourable Reference Range (261 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7130

NAME: Blanket bogs (* if active bog)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

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GSI(d)http://www.gsi.ie/NR/rdonlyres/66623738-C908-4B86-92D2-2FBDD0D5DBA9/0/LandslidesandthePlanningProcess_A_Doyle.pdf
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2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	45900	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	45900
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	2286.78		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	much more than (>>)	
	unknown	No	
	method	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. Whilst this figure is unknown it is deemed to be more than the current area due to declines in the intervening period. Losses are predicted to be more than 10% of the FRA.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
non intensive goat grazing (A04.02.04)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	high importance (H)	N/A
hand cutting of peat (C01.03.01)	medium importance (M)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
Erosion (K01.01)	high importance (H)	N/A

damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
non intensive cattle grazing (A04.02.01)	low importance (L)	N/A
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
non intensive horse grazing (A04.02.03)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	high importance (H)	N/A
hand cutting of peat (C01.03.01)	medium importance (M)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Roads, paths and railroads (D01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
off-road motorized driving (G01.03.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
Erosion (K01.01)	high importance (H)	N/A
damage by herbivores (including game species) (K04.05)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Andromeda polifolia

Arctostaphylos uva-ursi

Breutelia chrysocoma

Calluna vulgaris

Carex bigelowii

Diplophyllum albicans

Drosera spp. (counted separately)

Empetrum nigrum

Erica tetralix

Eriophorum angustifolium
Eriophorum vaginatum
Menyanthes trifoliata
Myrica gale
Non-crustose lichens (counted separately)
Odontoschisma sphagni
Pedicularis sylvatica
Pinguicula lusitanica
Pleurozia purpurea
Polygala serpyllifolia
Racomitrium langinosum
Rhynchospora spp. (counted separately)
Scapania gracilis
Schoenus nigricans
Sphagnum spp. (counted separately, excluding S. fallax)
Trichophorum germanicum
Vaccinium spp. (counted separately)

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the National Survey of Upland Habitats. At each monitoring stop the presence of a minimum of seven positive indicator species was required to pass the target for this indicator.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The estimate for surface area of this habitat excludes afforested, cutaway and reclaimed blanket bog, all of which cover extensive areas. Due to the occurrence of blanket bog in association with wet heath, dry heath, fens and other habitats and the absence of ground survey for large areas, the estimate of surface area for this resource is therefore problematic and remain guestimates only. Area of habitat within SAC network = 1448.49 km2 Area of habitat outside SAC network = 838.30 km2 Area of habitat within SAC network that is QI = 1365.77 km2 Area of habitat within SAC network that is not QI = 82.71km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Bad (U2)
	qualifiers	declining (-)

2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers declining (-)
2.8.4 Future prospects	assessment Bad (U2) qualifiers declining (-)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	1448.49	max	1448.49
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Measures needed, but not implemented (1.2)	Administrative	medium importance (M)	Both	Enhance
Maintaining grasslands and other open habitats (2.1)	Administrative	high importance (H)	Both	Enhance
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	No effect
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Regulation/ Management of hunting and taking (7.1)	Administrative	low importance (L)	Inside	Enhance
Regulating/Management exploitation of natural resources on land (9.1)	Administrative	medium importance (M)	Both	Enhance

Field label	Note
Habitat code: 7130	
0.2 Habitat code	Blanket bog vegetation in Ireland is described by Schouten (1984), Doyle and O' Críodáin (2003) and in Conaghan et al., (NPWS 2000). Vegetation types of upland and lowland blanket bog conforming to Annex I habitat 7130 have been summarised by Fossitt (2000) while Perrin et al. (2013a.) describe several communities from the work to date of the National Survey of Uplands Habitats though it should be noted that the principal lowland blanket bog cSACs have not yet been assessed. In Ireland they may be broadly divided into upland and lowland communities. The peat is typically more than 50 cm deep and often 1-2 m deep in the uplands or up to 7 m deep in the lowlands. Blanket bogs generally occur on level ground or gentle slopes although upland blanket bog can occasionally occur on steeper ground up to 40 degrees in the wettest districts. Areas of blanket bog that are 'active' are granted priority status by the Habitats Directive. Active bog contains a significant area of vegetation that is normally peat-forming. For blanket bog this includes not only Sphagnum spp. and other bryophyte species but also Eriophorum spp. and some of the other vascular plant species. Plant communities of active bog can be very variable. Lowland blanket bogs typically have a relatively high cover of Schoenus and Molinia with hummock-forming mosses Sphagnum capillifolium, S. papillosum and Racomitrium lanuginosum and more locally S. austinii and S. fuscum. Lawn mosses include S. magellanicum and Campylopus atrovirens. Pleurozia purpurea is a liverwort characteristic of lowland blanket bog though also found in some localised wet upland heath communities. Lowland bog vascular plant species include Potentilla erecta, Carex panicea, Pedicularis sylvatica, Narthecium ossifragum and Rhynchospora alba. Upland blanket bogs are often drier with considerable dwarf shrub cover including Calluna, Empetrum nigrum and Vaccinium myrtillus with frequent Trichophorum germanicum and Eriophorum vaginatum. A bryophyte layer can also be well-developed in wetter intact upland blanket bog where Sphagnum capillifolium may be predominant and S. papillosum, Hypnum cupressiforme and Racomitrium lanuginosmu frequent. Lichens of the Cladonia genus occur on upland and lowland bogs. Other Annex I habitat frequently associated with lowland blanket bog habitat are 7150 Rhynchosporion depressions and 3160 Dystrophic pools and more locally also 7140 Transition mires and quaking bog and 7230 Alkaline fen. Intact upland bogs can also encompass 3160 Dystrophic pools. Conversely, inactive blanket bog should be defined as areas of blanket peat lacking a significant area of peat-forming species although there are no specific guidelines in this regard. Application of this term is likely to vary depending on the spatial and temporal scale of observation or surveying. The approach taken by the National Survey of Upland Habitats (NSUH) has been to exclude from the habitat definition entirely the areas of eroded bare peat, areas of milled or cutover bog that have not re-vegetated and areas of blanket peat that have been afforested. Degraded areas on deep peat where the vegetation is now characteristic of other habitats could be deemed as 'inactive' blanket bog. In the NSUH, however, the decision was made not to define areas on the basis of the potential vegetation that could be restored unless a site-specific assessment of restoration feasibility has been conducted and restoration objectives have been set. This was not the case for the NSUH sites therefore these degraded areas were therefore defined on the basis of current vegetation (some of which conformed to other Annex I habitats such as 4010 Wet heath and 4030 Dry heath). Areas of eroded bog colonised by almost monospecific swards of Eriophorum angustifolium were however defined by the NSUH as inactive blanket bog; these areas may recover to active bog status or erode further. Due to the difficulties in differentiating between active and inactive blanket bog and because, with the exception of the NSUH, none of the data sources used have distinguished between these types, the assessment presented within this document is jointly made for both active and inactive blanket bog.

Field label	Note
Habitat code: 7130	
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat is widespread across the country, particularly in the west, but is absent from significant areas of the north midlands.

Habitat code: 7130

Field label	Note
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 7130 or Fossitt codes PB2 or PB3 in their attributes. Available data sources were reviewed and data were extracted from the following sources: Ballycroy National Park Habitat Map. An NPWS project which compiled habitat data from available information. Datasets used were from 1991-2009. Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). Carlow Pilot Habitat Mapping Project. GIS files for this Carlow County Council habitat survey were available. Cavan Habitat Map. A Cavan County Council habitat survey (Kearney 2010). Habitat information is derived from aerial photographic interpretation with targeted field surveys. Cavan Wetland Survey. GIS files for this Cavan County Council habitat survey were available. Clare Wetland Survey. A Clare County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Crushell and Foss 2008). Coillte LIFE Blanket Bogs. GIS shapefiles provided by Coillte which indicate the location of their blanket bog restoration sites. Commonage Framework Plans (CFP). An NPWS project providing the location of commonage areas and the habitats recorded. A widespread dataset covering over 4,400 km^2. Anon (1998) is a manual for the preparation of commonage framework plans. In the 2007 report, 154 CFP records of blanket bog were excluded, presumably following aerial photograph interpretation. These records were also excluded from the current distribution. 29 further CFP records which constituted outliers to the current distribution were also excluded following aerial photograph interpretation. 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. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. Dún Laoghaire Rathdown habitat survey 2011. GIS files for this Dún Laoghaire Rathdown County Council habitat survey of were made available. Galway City Habitat Inventory. A Galway City County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Anon. 2005). 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 cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs.

Habitat code: 7130

Irish Semi-natural Grassland Survey. An NPWS project mapping semi-natural grassland sites and assessing the conservation status of Annex I grassland habitats (Martin et al. 2007, 2008, O'Neill et al. 2009, 2010). Where the habitat had been recorded in the ISGS database as an internal habitat the centroid point for the survey site was entered in the point shapefile as an indication of where the habitat occurred.

Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron and Perrin 2011).

Laois Habitat Survey. A Laois Heritage Forum habitat survey (Hickey & Tubridy 2009). Habitat information is based on field surveys.

Limestone Pavement Project. An NPWS project mapping and assessing the conservation status of Annex I habitats associated with limestone pavement. The methodology for this survey is detailed in Murphy and Fernandez (2009). Habitat information is based on field surveys.

Mayo Local Area Surveys. GIS files for this Mayo County Council habitat survey of nine towns in Co. Mayo completed by Atkins Ireland were made available.

National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these.

Red Grouse Habitat Survey. An NPWS project assessing the availability of suitable habitat for Red Grouse (Crushell & O'Callaghan 2008). Habitat details for 1 km sample squares were based on field surveys.

Sligo Wetlands Survey. A Sligo County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson 2009).

South Clare Habitat Map Cratloe to Parteen. GIS files for this project were made available by Clare County Council.

Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available.

Wicklow Wetland Survey. A Wicklow County Council project which compiled habitat data from available sources with additional aerial photograph interpretation and targeted field surveys (Wilson and Foss 2011).

Polygons were clipped extensively to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. The boundaries of designated sites which contained the relevant habitat were omitted if more localised datasets (e.g. Commonage Framework Plans and/or Conservation Planning Unit data) had coverage of greater than 50% within the designated site. Boundaries of designated sites were further reviewed to ensure their inclusion would not extend the distribution of the habitat into 10 km grid squares which, following aerial photograph review, were determined not to contain the relevant habitat. Where this occurred designated sites were represented by points rather than polygons. The point shapefile was used to locate records from the ISGS and points locating pNHA sites for which no polygon shapefiles were available.

Data used for the Wicklow Mountains were extracted from the CPU, the CFP and the Red Grouse Habitat Survey for the Wicklow Mountains. Also used were Corine National Land Cover dataset (EPA 2000; CORINE Land Cover Map 2000); the National Soils and

Field label	Note
	Parent Material maps (Fealy, R., Loftus, M. & Meehan, R., 2006); Soils and sub-soils mapping project, Teagasc, Dublin; and the digitised version of the peatland map of Ireland (Hammond 1979). Information compiled in 2000 on the distribution of 7130 [Conaghan J. (2000) The distribution, on a 10km square basis of selected habitats in the Republic of Ireland. Enviroscope Environmental Consultancy, Galway. Report to Dúchas, The Heritage Service] has been superseded by more recent data.
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012 for 5 SACs containing blanket bog habitat. The date of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "…seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/ Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing, the latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis and the habitat has been recorded at each of the fourteen sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b 2012a,b, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Several authors consider the vulnerability of peatlands and blanket bog to climate change. Black et al. (2008) quantifies the afforestation of peat soils in the period 1990 to 2006. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 7130 and include important sites for this habitat such Ox Mountains Bogs cSAC and Mweelrea /Sheeffry/Erriff Complex cSAC. The NSUH has so far concentrated mainly on the northwest of the country. The reliability of some data used in the 2007 assessment may be questioned due to the differences in criteria used to identify the habitat and in particular to differentiate blanket bog from wet heath. For example, use was made of data from the CFP which relied more on soil depth than floristics to determine habitats. In the 2007 report, 154 CFP records of blanket bog were excluded, following aerial photograph interpretation and these are also excluded from the current distribution. 29 further CFP records that occurred as outliers also have been excluded as non-7130 habitat following confirmation through aerial photograph interpretation.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.

Field label	Note
Habitat code: 7130	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 49,500 km2. Differences in range were partially due to the use of different data sources. No records could be found to support an area of range south of Slieve Beagh in Monaghan, previously included on the basis of Hammond (1979). Squares omitted in south Wicklow / north Wexford had previously been included solely on the basis of rainfall data. Some squares in southern Clare previously included were omitted as they contain only raised bog. All these areas have been checked on aerial photographs by NPWS. Some other squares previously included in the distribution were similarly omitted because there were no records to support their inclusion.
2.3.10 c) Reason for change - use of different method	The use of the range tool also contributed to the change in range, for example by creating a new gap in the range in Limerick.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried out in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon and point shapefiles used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat. For polygons from other sources (e.g. CPU) that mapped specific areas of this habitat, habitat percentages were calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 7130 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. For each of the point records not intersecting within a polygon that was yielding an area, 1km2 of habitat was estimated.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	The NSUH reported losses for this habitat at the sites surveyed due chiefly to turf-cutting in the lowlands and overstocking initiated erosion in the uplands. Outside the SAC network losses in area will have been much higher due to impacts including afforestation, commerical and domestic peat cutting and windfarms. Modification of the blanket bog habitat is likely to exceed 10% since 1994. It is also likely that significant areas of active blanket bog have degraded to inactive status.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 3907.27 km2. More accurate knowledge of the area of habitat 7130 is available from the NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	In the last report on habitat 7130 (NPWS 2007), calculations in regard of habitat area were based on the estimate from Ryan & Cross (1982) of 5172.31 km2 which was taken to be the unmodified habitat area in 1982. This had in turn been based on the estimates for blanket bog cover presented by Hammond (1979). Using the estimated annual loss due to afforestation and peat extraction of Ryan & Cross (1982) of 52.71 km2, this yielded a habitat area of 4539.79 km2 in 1994 when the Habitats Directive came into force. Extrapolating further and assuming a constant rate of loss, the estimate of habitat area in 2006 was 3907.27 km2. This methodology would now estimate the habitat extent of habitat 7130 to be 3591.01 km2 in 2012. This methodology has not been used however. Firstly, it would assume a constant rate of loss over a 34 year period, which is unlikely. Secondly, the map of Hammond probably overestimates habitat area as it assumes 100% coverage of blanket bog within each of the relevant polygons. This is also unlikely especially as wet heath is not considered as a separate peatland habitat by Hammond. Thirdly, continued use of this methodology as a means to estimate and monitor the national resource is untenable. Thus it was rejected in favour of the records based estimate presented above.

Habitat code: 7130

2.5 Main pressures

Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing or trampling are high, or where blanket bog has been degraded by higher numbers in the past, is still causing degradation or impeding habitat recovery.

Some afforestation with non-native conifers has been recorded within cSACs though this activity is much more prevalent outside of designated areas. Afforestation of peatlands in Ireland was estimated as c. 4,000 ha per year in 2006 (Black et al. 2008) however the extent to which blanket bog is being impacted is unknown in the absence of a publicly accessible centralised register of land use change.

Turf cutting by hand has been recorded within the majority of cSACs surveyed by the NSUH and unregulated mechanised turf cutting has been recorded within several cSACs. This is particularly damaging where occurring on deep wet, bog and use of the chainsaw/sausage machine is considered the most destructive method used as it does not require road access thus can occur on intact, remote areas. Peat cutting activity while locally significant in many cSACs is also much more prevalent outside of same

A review of Irish wind farm developments has indicated that to date 43.1% of wind farms have impacted blanket bog habitat. The impacts have not been quantified but include blanket bog habitat loss and fragmentation and likely significant changes to patterns of surface water flow as a result of turbine access road infrastructure. A number of blanket bog slippages and landslides associated with windfarm construction activity or post-construction have also occurred. This review located wind farms using grid references provided by the Sustainable Energy Authority of Ireland, with locations for recent wind farms being added from the Irish Wind Energy Association website. Aerial photograph interpretation was then used to identify the habitats in the vicinity of these co-ordinates.

Campylopus introflexus is the most frequent invasive non-native species within this habitat but, unless it forms extensive carpets which can suppress heather re-establishment, it is considered a mild or temporary invasive as it does not have long-terms effects on biodiversity. The more pernicious invasive non-native species Rhododendron ponticum, whose spread is very difficult to control, has become established at a number of sites.

Damage from fire was recorded within this habitat at 50% of the sites surveyed by the NSUH.

Severe peat erosion is frequent within upland blanket bog.

“Water abstractions from groundwater” and “Damage by herbivores (including game species)” refer to the digging of drainage ditches and deer grazing, respectively.

Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification and nutrient enrichment impacts on blanket bog as it is an oligotrophic habitat subject to high precipitation rates. Nitrogen deposition may encourage more nutrient-demanding species such as grasses at the expense of bryophytes. In general western districts are less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. It is also possible that Nitrogen enrichment from years of high sheep densities could have impact species composition and ecosystem function.

Climate changes observed over recent decades are inconsistent with trends caused by natural forces. Many independent lines of evidence have shown that the warming of the past 50 years is primarily due to the human-caused increase in greenhouse gases.

A recent review of meteorological data for Ireland demonstrates: an increase in the number of warm days (those with temperatures over 20 degrees C) in the period 1961 to 2010; a decrease in the number of frost days (those with temperatures below 0 degrees C) in the period 1961 to 2010; annual average surface air temperature

increased by approximately 0.8 degrees C over the last 110 years; a rise in temperatures in all seasons; a 60 mm or 5% increase in annual average rainfall for the period 1981 to 2010 in comparison to the 30-year period 1961 to 1990; in general, larger increases in rainfall amounts in the western half of the country; some conflicting patterns in the number of wet days (days with rainfall greater than 0.2 mm) and heavy rain days (days with rainfall greater than 10 mm), but an apparent increase in both in the west, particularly mid- and north-west (Dwyer, 2013).
Climate change presents an immediate and significant threat to Ireland's natural environment (Heritage Council 2009). As rain-dependent habitat 7130 blanket bog requires precipitation of greater than 1250mm/pa on well over 200 day annually, as well as cool temperatures (conditions of low evaporation and transpiration), as peat formation requires waterlogged conditions. These requirements render blanket bogs potentially vulnerable to climate changes through impacts on blanket bog plant and animal species and on other aspects of ecosystem functioning. For example changes in the reproductive or dispersal abilities of blanket bog flora can lead to vegetation community compositional changes and to fundamental ecosystem changes including cessation of peat formation.

Sweeney et al. (2008) predict that the suitable climatic area for both upland and lowland blanket bog will decrease substantially by 2075. Coll et al. (2011) report that climate change is expected to result in a decrease in the summer water table in peatlands through drier summers and alteration of pH, while modification of the nutrient cycle may lead to bogs becoming net emitters of carbon (Kurbatova et al. 2009 as cited in Coll et al).
It is a complex picture and considerable uncertainty exists in identifying impacts related to climate changes already detected (Dwyer, 2013) and potential future effects of continuing change however natural peatlands (including blanket bogs in favourable condition) are considered better able to buffer the impacts of external perturbations such as small changes in climate but are unlikely to survive as carbon sinks if large changes in precipitation and temperature occur (EPA, 2011). Research over a 5-year period on, Glencar bog, a relatively intact blanket bog cSAC in southwest Ireland (Sottocornola and Kiely, 2010) report that CO2 sequestration is higher in intermediate rather than extreme meteorological conditions whereas under climate change predictions of higher temperature the results suggest that ecosystem respiration might increase in winter. Lower precipitation and higher temperatures in the summer would be expected to reduce CO2 uptake that could partly be compensated for by greater uptake in dryer autumns and warmer winters. A longer growing season would benefit CO2 uptake however wetter conditions would be likely to lower CO2 uptake in the spring. Even a relatively intact blanket bog can switch from sink to source depending on meteorological conditions as monitoring over 6 years, for this bog, has shown that for 2 years it was a source of carbon whereas for 4 years it sequestered carbon (Koehler et al., 2010).

Uncontrolled and inappropriate land management in Ireland has led to losses of peat-forming vegetation (and biodiversity) leaving extensive areas of degraded blanket bog and of bare and eroding peat. Carbon loss and gain has many pathways, including particulate organic carbon (POC) in surface erosion, dissolved organic carbon (DOC) losses into drains and streams, flux gases at the soil surface, such as soil respiration of carbon dioxide (CO2) and methane (CH4) and uptake through primary productivity (CO2). UK research reports that erosion and subsequent POC loss is one of the main drivers of carbon loss in upland peatlands. Research in the west of Ireland Zwart (1994) proved that degraded peat erodes rapidly and reported rates of up to 250 tonnes per km2 over a 3-month period. Unsustainably high sheep densities prior to stock reductions, implemented according to Commonage Framework Plans, in 2002 was one of the main causative factors in Ireland in this regard and recovery where occurring is slow. In the uplands of central England high levels of atmospheric deposition of SO2 during the industrial revolution caused widespread Sphagnum death that exposed extensive areas of peat to the erosive elements. These areas are now undergoing costly remediation efforts to reduce climate change impacts and achieve biodiversity and water quality gains.

Habitat code: 7130

Increased rainfall would, in general, be expected to enhance bog vegetation growth and hence peat formation on blanket bog the latter is also controlled by temperature, season etc (Sottocornola and Kiely, 2010). Additionally blanket bogs in unfavourable/degraded condition are likely to be more vulnerable to the effects of climate change through exposure of peat and hence higher susceptibility to desiccation, cracking, erosion, and to peat slippage exacerbated by meteorological extremes. Geological Survey of Ireland consider that predicted climate change will result in increased landslide hazard with higher and more intense rainfall in certain parts of western and northwest Ireland (GSIb). Most bog bursts and peat slide events are triggered by high magnitude rainfall events (Crisp et al. 1964, Carling 1986, Dykes and Kirk 2001, Warburton et al. 2004, Dykes et al. 2008 as cited in Coll, 2011). However statistically, a particular location will have experienced many previous extreme events without failure and not all extreme events result in landslides (GSIc). This indicates that there are other potential causative factors involved for example: overland flow and progressive erosion; pore pressure increases; changes in material / strength properties and catchment wetness index which is function of slope and contributing area (GSIc). (Some of these factors are likely to be affected by current/or past land uses that alter/have altered ecosystem functioning and peat/peatland properties and behaviour and resilience to climate change). UK and Irish data indicate that roughly half of all slippage events at present occur in the late summer months in relation to convective storm activity (Warburton et al. 2004 as cited in Coll et al. 2011). Therefore, associated with an increase in the intensity of convective activity more slippage events could be expected with climate change in the summer months, particularly if antecedent hotter and drier conditions have resulted in increased surface cracking (Sweeney et al. 2008). Other concerns relating to prospective seasonal changes include increases in winter rainfall leading to enhanced erosion.

An increased risk of fire is likely in areas where drought periods increase as a result of climate change and the intensity and/or spread of fires would also be expected to increase in such conditions. This may greater impact on sites close to the edge of blanket bog minimum rainfall range and most severely if a bog is already compromised by other pressures.
Invasive non-native species may also pose a greater risk to blanket bog habitat if their growth conditions are more favoured by changes in climate. Species such as Rhododendon ponticum or Lodgepole pine and Sitka spruce (the predominant non-native conifer species of plantation forestry on blanket bog and heath) could conceivably increase their spread on blanket bog in areas where more frequent or prolonged drought periods increase desiccation/lower watertables. A spread of native scrub woodland onto blanket bog may also occur in a similar way. Similarly it is also possible that dwarf shrub and other species characteristic of drier niches on blanket bog could replace the species of wetter niches.

It is difficult to separate out and quantify the habitat effects of changes in climate from the deleterious effects of current land use pressures but continuing climate change will exacerbate existing impacts especially in regions/areas where rainfall events increase in frequency and/or intensity and where more prolonged periods of drought and/or higher temperatures occur or where seasonal meteorological patterns that support blanket bog habitat undergo significant change.

We have insufficent knowledge and data to disentangle the current impact of climate change from those of land use impacts. The latter are the clearly the main drivers of degradation however extreme rainfall events can caused severe localised damage on susceptible sites but can also increase the rate of sheet erosion on expanses of blanket bog that are already poorly vegetated/degraded.

Effective restoration of degraded blanket bog habitat (where feasible) is required over extensive areas to improve the condition and capacity of this habitat to adjust to, at least some of, the impacts already occurring and likely to increase as a result of the predicted changes in climate.

Field label	Note
	Additional pressures which do not fit on the form: D02…Utility and service lines…Low E01.03…Dispersed habitation…Low H05.01…Garbage and solid waste…Low
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. Information relevant to this habitat was also utilised where possible from the NPWS Site Inspection Report database; some of the impacts recorded in this database were not specific enough. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures as there is no evidence they will in the immediate future. Future impact of predicted climate change is difficult to gauge with current state of knowledge and the many uncertainties including in rate and intensity of the changes in climate. It is tentatively assessed as low for intact sites since if blanket bog is in favourable condition it is likely to retain better functioning of ecosystem processes that can allow for operation of checks and balances that may help minimise predicted impacts (although more longterm studies are required to inform this complex science). However for degraded sites climate change impacts are likely to exacerbate the deleterious effects of existing land use pressures for example increased frequencies of extreme rainfall events will shift large volumes of peat from areas that are already eroding and those with reduced vegetation cover e.g. from heavy grazing. Geographic and topographic variations in the effects of predicted climate change are also likely with northwestern and upland sites more likely to incur increased rates of erosion and southeastern sites more prone to increased desiccation. Considering that significant areas of blanket bog are in poor condition (some in states of degradation / others in stages of recovery) it is considered that the overall impact of climate change on blanket bog be assessed as Medium. Additional threats which do not fit on the form: A04.02.04…Non-intensive goat grazing…Low D02…Utility and service lines…Low E01.03…Dispersed habitation…Low G05.07…Fences, fencing…Low H05.01…Garbage and solid waste…Low
2.7 Complementary information	The list of typical species is based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement.
2.7.02 Typical species - method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop a minimum of seven indicator species was required. As this was a baseline survey, trends for the assemblage and for individual species were not possible to assess.

Field label	Note
Habitat code: 7130	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover several important sites for this habitat in Ireland. A total of 255 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. The main reasons for failure were erosion, drainage, burning, disturbed bare ground, lack of indicator species and lack of bryophyte/lichen cover. 1. No. of positive indicator species present ≥ 7 (7.1%) 2. Cover of bryophyte or lichen species ≥10% (10.6%) 3. Cover of potentially dominant species each <75% (7.5%) 4. Cover of negative indicator species <1% (0.8%) 5. Cover of non-native species in relevé <1% (1.2%) 6. Cover of non-native species in local vicinity <1% (0.8%) 7. Cover of scattered native trees and scrub <10% (0.0%) 8. Crushed or pulled up Sphagnum <10% of Sphagnum cover (0.8%) 9. Browsing of ericoids, Empetrum nigrum and Myrica gale <33% (3.5%) 10. No signs of burning into moss/lichen layer or exposure of beat due to burning (5.1%) 11. No signs of burning in sensitive areas (8.1%) 12. Cover of disturbed bare ground in relevé <10% (5.1%) 13. Cover of disturbed bare ground in local vicinity <10% (8.3%) 14. Area showing signs of drainage <10% (7.9%) 15. Cover of erosion gullies and eroded areas within the greater bog mosaic <5% (23.5%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is less than the FRV for area and estimated to be more than 10% below the FRV. The FRV may change following future fieldwork.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Expert judgement determines ongoing decline due to erosion, peat cutting, afforestation, drainage, windfarms, development, burning, overgrazing and trampling.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 255 monitoring stops recorded in this habitat by the NSUH, 112 stops (44%) failed. As this failure rate is over the 25% threshold hence a U2 – Bad assessment is made. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat. Lowland blanket bog is probably underrepresented in the NSUH sample due to the focus on upland sites.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the main impacts on this habitat is grazing, an improving trend in this regard would be suggested due to the Commonage Framework Plans (CFP). However,as recovery is slow, this improvement is considered likely to be exceeded by ongoing deleterious effects from peat cutting, erosion, drainage and burning etc. A "-declining" qualifier is therefore applied. Note, also that the CFP does not provide data specific to habitat 7130 alone and has had to date limited monitoring. The NSUH is a baseline survey and thus provides limited data on trends. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007).
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Bad prospects, future prospects is assessed as U2 –Bad. A speculative assessment of U2 – Bad was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / <<FRV / -declining / <<FRV / Bad S&F / <<FRV / -declining / <<FRV / Bad

Field label	Note
Habitat code: 7130	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one or more of the parameters are declining and none are improving, the qualifier is assessed as –declining.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U2 – Bad, the overall assessment is U2 – Bad.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U2 – Bad.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Habitat code: 7130

3.2 Conservation measures

More than half of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, designed to prevent and remedy environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities are in place to protect the habitat from damage in the wider countryside (6.3).

Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation. In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-Nephin SPA (2.1). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere.

Restoration works on just under 2,000 ha of afforested blanket bog during the Coillte EU LIFE project (that ended in 2007) mainly through removal of trees and drain blocking has initiated recovery of bog/heath vegetation on several sites although it is too early to gauge whether typical blanket bog flora or active blanket bog will be achieved at all sites as drainage, shrinkage and compression effect on the peat consequent on afforestation (as well as self-seeding of conifers) is likely to impede recovery at a number of sites.

In areas of upland blanket bog where erosion is severe or very severe and large areas of bare peat have been exposed, further reduction in stock numbers may help somewhat, however practical restoration measures will also be required to prevent further losses of blanket bog and peat soils from these areas. These measures could include damming of erosion gullies, seeding of bare peat with Sphagnum propagules, use of geotextile mats to stabilise the peat, and planting of Eriophorum angustifolium. There has been little if any restoration work of this nature of upland blanket bogs in Ireland. National guidelines would be required, with financial incentives and/or funding of restoration works available through an agri-environmental scheme or collaborative restoration projects. Many of the areas requiring restoration measures are commonage or in multiple ownership and a co-ordinated approach would be required.

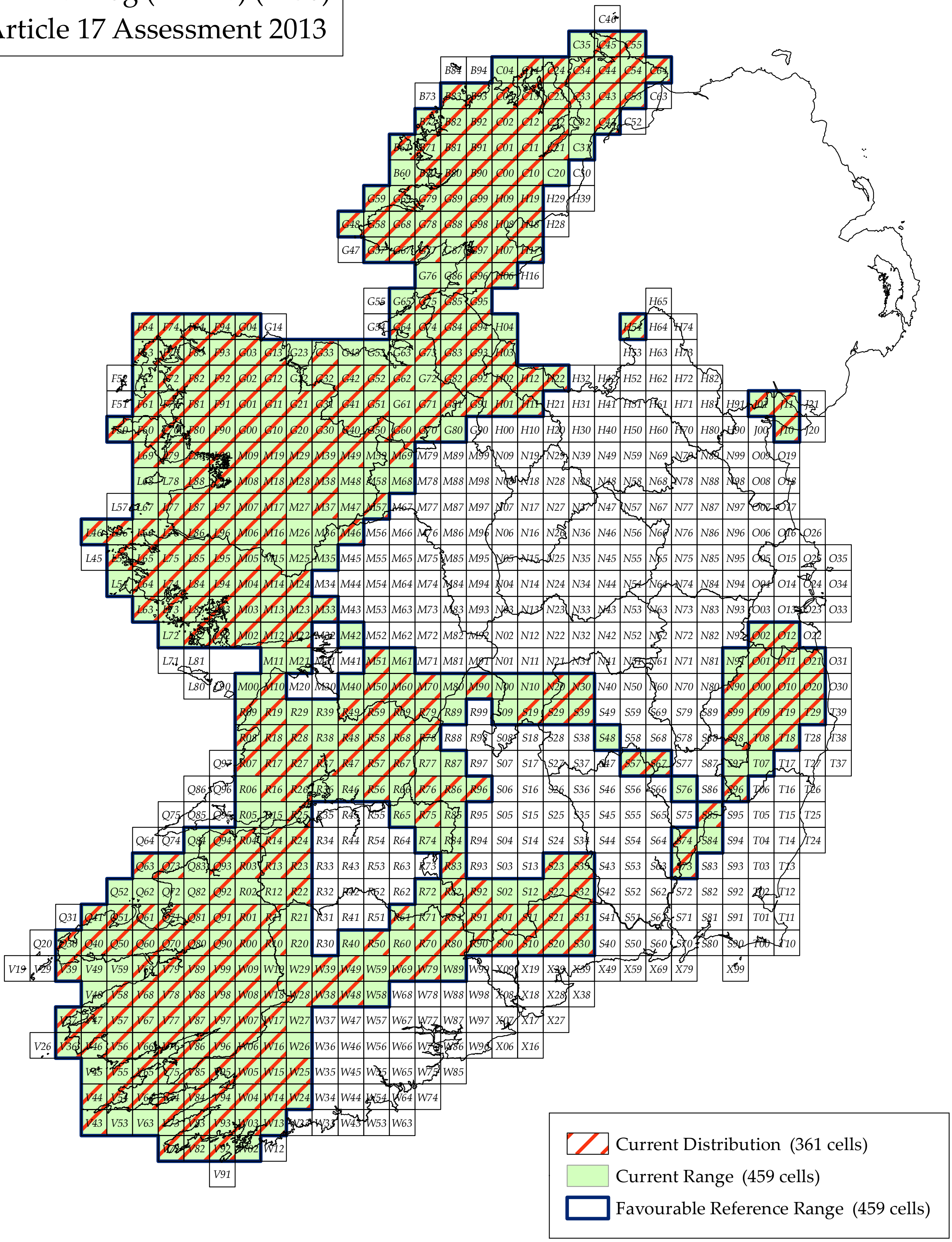
Restoration of lowland blanket bog affected by drainage and/or peat cutting could also be achieved in a similar manner. Substantial and widespread habitat restoration is required to move habitat 7130 towards FCS (1.2).

Formulation of a National Peatland Strategy is currently underway among relevant stakeholders and with public consultation will help identify priorities and strategies for ecologically sensitive peatland management including the issue of peat extraction in Natura 2000 sites (9.1).

All applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. This measure is rated as ‘no effect’ as adaptation of forestry regulations is required to enhance protection of this habitat.

Field label	Note
Habitat code: 7130	
	Regulated, small-scale heather burning can produce a diverse structure of heather of high conservation value. However, most heather burning is conducted too frequently, in a poorly or uncontrolled fashion over large areas, probably with the aim of promoting grassland for grazing. Burning is probably less appropriate management for blanket bog than for dry heath. National guidelines and regulation on appropriate heather burning procedures are required (1.2). In areas of commonage, heather burning should be regulated at a local level. Practical conservation measures in Killarney National Park include culling of deer (7.1).

Blanket Bog (Active) (7130)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7140

NAME: Transition mires and quaking bogs

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2005-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

ANON 2010. County Meath Wetlands and Coastal Habitat Survey. A Report prepared for Meath County Council and the Heritage Council.

ATKINS. 2008. Mayo Habitats Survey. A Report by Atkins for Mayo County Council.

BARRON, S. J. & PERRIN, P. M. 2010. Review and amendment of GIS mapping for blanket bog NHAs. A report submitted to the National Parks and Wildlife Service.

CRUSHELL, P. & FOSS, P. 2008. The County Clare Wetlands Survey: Desk Study and GIS Preparation. A Report prepared for Clare County Council, Ireland.

CRUSHELL, P., FOSS, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Kildare Wetland Survey. Part I: Main Report. Report prepared for Kildare County Council and The Heritage Council.

FOSS, P. 2007. Transition mires and quaking bogs (7140) conservation status assessment. Unpublished report to the National Parks and Wildlife Service. http://www.npws.ie/publications/euconservationstatus_NPWS_2007_Cons_Ass_Backing_V3.pdf

FOSS, P. J. & CRUSHELL, P. 2012. Wetland Survey County Monaghan II. Report prepared for Monaghan County Council and The Heritage Council.

FOSS, P., CRUSHELL, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council.

KILROY, G., DUNNE, F., RYAN, J., O`CONNOR, A., DALY, D., CRAIG, M., COXON, C., JOHNSTON, P. & MOE, H. 2008. A framework for the assesment of groundwater dependent terrestrial ecosystems under the water framework directive (2005-W-FS-5). Associated datasets and digital information objects connected to this resource are available at Secure Archive For Environmental Research Data (SAFER) managed by the Environmental Protection Agency Ireland. http://erc.epa.ie/safer/resource?id=b5799c70-224b-102c-b381-901ddd016b14.

KIMBERLEY, S. 2013. Conservation status assessment for three fen habitat types. Unpublished report to the National Parks and Wildlife Service.

NATURA 2005. Galway City Habitat Inventory. A Report prepared by NATURA Environmental Consultants on behalf of Galway City Development Board.

NATURA 2007. Westmeath Fen Study. Draft Final Report prepared for Westmeath County Council and The Heritage Council by NATURA Environmental Consultants.

PERRIN, P.M., BARRON, S.J., ROCHE, J.R. and O`HANRAHAN, B. 2010. Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 1.0. Irish Wildlife Manuals, No. 48. National Parks and Wildlife Service, Department of Environment, Heritage and Local

Government, Dublin, Ireland. Data extracted from Phase 3 of the National Survey of Upland Habitats.
TUBRIDY, M. 2006. Heritage Surveys of Vulnerable Landscape. A Report for Clare County Council.
WILSON, F. & FOSS, P. J. 2011. The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council.
WILSON, F. 2009. County Sligo Wetland Survey. A Report prepared for Sligo County Council and The Heritage Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	23600	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	23600
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range as there is no evidence of a decline since the Directive came into force. The FRR is considered to encompass all ecological and geographical variation of the habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	93.77		
2.4.2 Year or period	2005-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	Although losses of habitat area are considered to have occurred since the Directive came into force the magnitude of the decline is unknown. The FRA is set as > than the current area. It is unlikely that >10% of the resource has been lost since 1994. An additional 1-10% of the current area is considered adequate to ensure the long-term viability of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
missing or wrongly directed conservation measures (G05.07)	high importance (H)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
missing or wrongly directed conservation measures (G05.07)	high importance (H)	N/A
Changes in abiotic conditions (M01)	high importance (H)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A

diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Peat extraction (C01.03)	high importance (H)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Agrostis stolonifera
Aneura pinguis
Bryum pseudotriquetrum
Calliergon giganteum
Calliergonella cuspidata
Campylium stellatum
Carex diandra
Carex lasiocarpa
Carex limosa
Carex nigra
Carex rostrata
Carex viridula
Cladopodiella fluitans
Drepanocladus revolvens
Epilobium palustre
Eriophorum angustifolium
Eriophorum gracile
Galium palustre
Hammarbya paludosa
Hydrocotyle vulgaris
Menyanthes trifoliata
Molinia caerulea
Myrica gale
Pedicularis palustris
Potentilla palustris

Ranunculus flammula

Rhynchospora alba

Rhynchospora fusca

Scorpidium scorpioides

Sphagnum angustifolium

Sphagnum cuspidatum

Sphagnum denticulatum

Sphagnum fallax

Sphagnum fimbriatum

Sphagnum papillosum

Sphagnum riparium

Sphagnum subsecundum

2.7.2 Species method used	The list of typical species below is based exclusively on the previous conservation assessment report for the habitat (Foss, 2007). This list was derived using a number of publications on Irish fen vegetation (O'Criodain and Doyle 1994, 1997, Doyle and O'Criodain 2003, White and Doyle 1982). The National Survey of Upland Habitats (Perrin et al., 2010) have devised a more refined vegetation classification scheme, based on standard vegetation classification schemes (White and Doyle, 1982; Rodwell, 1991, 1992), relevé datasets and expert judgement, in order to adequately record Annex I habitats. The PO1a community was recorded as 7140. This community is broadly described as infilling pools with Menyanthes trifoliata and, occasionally, Carex limosa. All species noted as indicative of PO1a were on the previous list of typical species. The species list for 7140 is evolving as more data is collected as part of the National Survey of Upland Habitats and more vegetation communities are being included; however as this survey is largely restricted to uplands the 2007 list has been retained until a more representative national coverage has been completed. Targets for cover and abundance of species from the vegetation communities from the National Survey of Uplands Habitats were derived to assess the quality of Habitats at monitoring stops.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	15.52 km2 of this habitat is listed as Qualifying Interest within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)

2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers unknown (x)
2.8.4 Future prospects	assessment Bad (U2) qualifiers improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	unknown (x)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	62.21	max	62.21
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Other wetland-related measures (4.0)	Administrative	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal	high importance (H)	Both	Enhance
Managing water abstraction (4.3)	Legal	high importance (H)	Both	Enhance
Measures needed, but not implemented (1.2)		high importance (H)		

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 7140	
0.1 Member State	Ireland
0.2 Habitat code	Transition mires and quaking bogs are characterised by a broad range of physically unstable peat-forming vegetation communities floating on surface water. In the Irish context, the associations Sphagno-Caricetum lasiocarpae and Calliergo-Caricetum diandrae correspond to transition mires. Transition mires typically occur in the wettest parts of raised bog, blanket bog or fen or at transition areas of open water and may reflect the actual succession from fen to bog.
1.1.02 Method used - map	A baseline, national field survey of fen habitats had not been conducted in Ireland to date. The habitat distribution was based to a large extent on the NPWS Fen Study Database compiled as part of the 'Study of the extent and conservation status of springs, fens and flushes in Ireland' (Foss, 2007). Additional sites were extracted from a variety of relatively recent field and desk-based surveys (Natura 2005, Tubridy, 2006, Natura 2007, Atkins 2008, , Crushell & Foss 2008, Wilson 2009, Barron & Perrin 2010, Perrin et al. 2010, ANON 2010, Wilson & Foss 2011, Foss & Crushell 2012, Foss et al. 2012 and Crushell et al. 2012).
1.1.03 Year or period	Numerous desk-based and field fen surveys have been conducted between 2005 and 2012; please note that data collated as part of the desk studies may have come from sources older than the publication date.
1.1.04 Additional distribution map	Transition mire (quaking bog) locations as per Section 1.1.2 were intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	A range map was derived following the standardised methods using the Article 17 Range tool.
2 Biogeographical level	ATL
2.1 Biogeographical region or marine regions	ATL
2.2 Published sources	Kimberley (2013) summarises current knowledge on this habitat. The previous conservation status assessment (Foss, 2007) was based on results generated from a desk study of the national extent of springs, fens and flushes. Numerous desk-based and field fen surveys have been conducted in recent years. Two desk studies have improved the geospatial information for fens occurring within blanket bogs (Barron and Perrin, 2011) and within SAC complexes (Kilroy et al. 2008). Recent field surveys as part of the National Survey of Upland Habitats have mapped fen habitats across SAC areas within 5 counties (Perrin et al., 2010). County wetland/habitat surveys of varying detail have been conducted within 10 counties.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The range trend was assessed as stable. There is no evidence to suggest that there has been a significant decline in the habitat distribution over the past 12 years. In the absence of a national field survey of fens, the current distribution and range maps provide a more refined estimate of the national habitat extent; however they may significantly underestimate the national resource.

Field label	Note
Habitat code: 7140	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.
2.3.10 c) Reason for change - use of different method	Discrepancies between the previous and current distribution and range are mainly attributed to differences in the mapping protocols. The previous habitat distribution map was generated by intersecting the entire SAC boundary with the 10km grid in cases where points in the NPWS Fen Survey Database occurred within non-extensive designated areas with a digitised site boundary. This process overestimated the extent of habitat in these cases. The NPWS Fen Study Database shapefile contained sites known to contain transition mire and sites thought to possibly contain transition mire. The latter sites were excluded from the current distribution owing to the high degree of uncertainty associated with the data. The 2007 distribution map also included all reported records for Carex diandra and Carex lassiocarpa from the Botanical Society of the British Isles 10km Flora distribution map. The presence of these sedge species does not equate to transition mire (7140) and some of these records date from the 1940s.
2.4.01 Surface area	The extent of transition mires within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat.
2.4.02 Year or period	The area figures were derived for the data surveyed and collated between 2005 and 2012. Some of the surveys may have been undertaken before the period specified.
2.4.03 Method used - Area covered by habitat	See 2.4.1
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	The trend in area is considered to be declining. This is due to landfill and land reclamation being noted as an ongoing pressure on 16% of sites referred to in Kimberley (2013).
2.4.07 Short-term trend - Method used	The trend estimate is based on expert opinion of the data sources available since there are no field-validated baseline data with which to compare the present area.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.
2.4.13 c) Reason for change - use of different method	There are two main reasons why the current maximum surface area estimate is significantly greater than the previous estimate given the reduced habitat distribution. Firstly, estimates of the area of transition mire habitat were outstanding for many sites in the NPWS Fen Survey Database at the time of the previous conservation assessment and the estimated surface area (19.54 km2) was regarded as a minimum in the absence of a detailed field survey of fens. Secondly, the current conservation assessment assigned an estimated area to sites recorded in the NPWS Fen Survey Database, included in the habitat distribution and lacking an area estimate. The estimated area was the median area of those sites (200000 m2 or 20 ha) in the NPWS Fen Survey Database with an estimated habitat area and also included in the current habitat distribution.

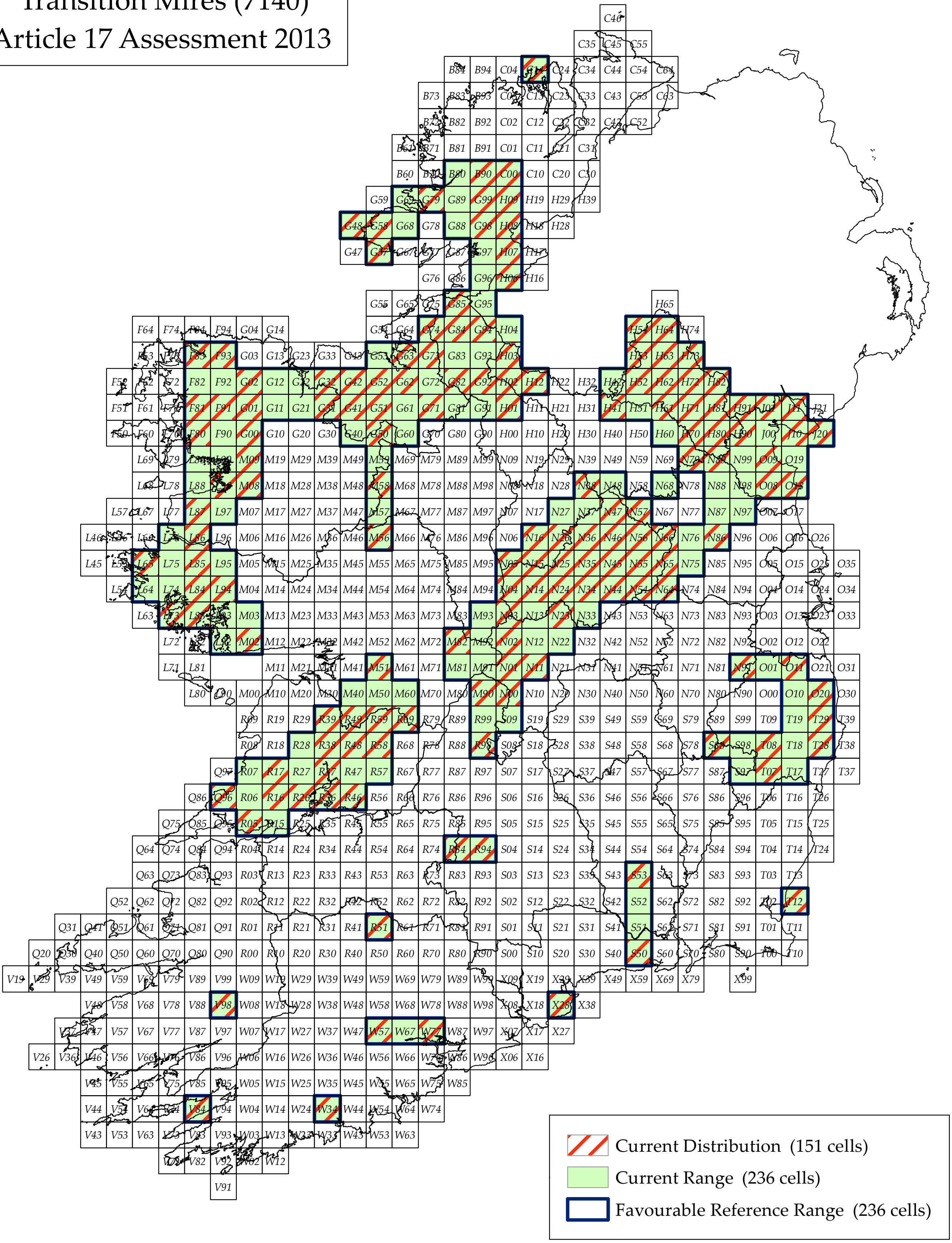
Field label	Note
Habitat code: 7140	
2.5 Main pressures	The ranked list of pressures was based on site-specific pressures recorded during six county wetland surveys (Atkins 2008, Wilson 2009, Wilson and Foss 2011, Foss and Crushell 2012, Crushell et al. 2012); general assessments of pressures impacting on the habitat as a whole (Natura 2005, Natura 2006, Natura 2007, WYG 2008, Crushell & Foss 2008) and expert judgement. See Kimberley (2013) for further details. Pressures noted prior to the reporting period were included due to the lack of national data on this habitat; they are considered to represent ongoing pressures.
2.6 Main threats	There is no evidence to suggest the decline of any of the listed pressures; therefore they also constitute threats. M01 (Changes in abiotic conditions) is added as a threat as changes in precipitation patterns and frequency driven by climate change will likely lead to alterations to the hydrological regimes of fen habitats.
2.7.04 Structure and functions - Methods used	The key ecological requirements are thought to be a permanently high water level, remaining close to the peat surface all year, and minimal water level fluctuation. There is currently no consistent, broad-scale assessment or monitoring of transition mire structures and functions in Ireland, however relevant indicators are under development based on an improved understanding of Irish fen ecological requirements and of ecological responses to pressures. The structures and functions of a subset of transition mire (7140) sites were assessed as part of the National Survey of Upland Habitats (Perrin et al. 2010). Sites were assessed for vegetation composition and structure and physical structures, including signs of damage. 9% of the sub-set of transition mire (7140) sites failed the conservation assessment. Assessments of damage are therefore used here as a proxy for assessments of site ecological condition. The most comprehensive, recent county-level field surveys of fens (Wilson 2009, Wilson & Foss 2011, Foss et al. 2012, Foss & Crushell 2012, Crushell et al. 2012) report that a majority of fen habitat types are damaged from human activities. It can be stated with moderate confidence that the structures and functions of more than 25% of the national resource of each of transition mires (7140) are impaired.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range is assessed as 'Favourable' as there is no evidence of a significant decline in the range since the Directive came into force.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The extent of transition mires within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat. There is evidence of ongoing losses in Area since the Directive came into force, however these losses are unlikely to be at a rate greater than 1% per annum or more than 10% below the FRA, therefore Area is assessed as Unfavourable –inadequate.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	As losses are considered to be ongoing the qualifier is set as declining, however Regulations referred to in 3.2 should halt this trend.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structures and functions were assessed in 2007 as 'Unfavourable-bad' owing to the broad range of pressures acting on the habitat. Structures and functions are again assessed as Unfavourable-Bad with the qualifier Unknown based on limited evidence that indicates that a significant proportion (>25%) of the national resource has impaired structures and functions. A national baseline fen survey has not been conducted to date in Ireland and disparate county level surveys are the main source of new information on transition mires. These surveys however use different habitat classification and mapping methods and there is still a lack of comparable data on the structures and functions of the habitat.

Field label	Note
Habitat code: 7140	
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structures & functions is assessed as unknown in the absence of a baseline survey of transition mire since the last reporting period.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Future prospects have been assessed as 'Unfavourable Bad given that a significant proportion (> 25%) of the habitat is damaged (cf Section 2.7.4) coupled with the fact that there are no restoration measures in place.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The trend for future prospects are considered to be improving due to additional protection afforded under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011 and the Groundwater Regulations 2010 (see 3.2 for further detail).
2.8.05 Overall assessment of Conservation Status	Range is assessed as Favourable as there is no evidence of a decline since the Directive came into force. Ongoing losses of habitat Area resulted an Unfavourable- inadequate declining assessment. Structure and Functions and Future Prospects were assessed as Unfavourable-Bad based on limited evidence that indicates that a significant majority (>25%) of the national resource has impaired structures and functions. The Future Prospects for the habitat are improved since previous conservation assessment due to recently implemented regulations that afford wetlands a higher level of protection. Conservation of transition mires in Ireland is compromised by the lack of a definitive vegetation classification or formal description of the habitat as it occurs in Ireland and of accurate geospatial data. A baseline fen survey is lacking and disparate county level surveys use contrasting habitat classification and mapping methods which compromise the comparability of the information. The 2007 conservation assessment cited a lack of reliable, comparable data as a major hindrance for accurately assessing the conservation status of the habitat as a whole and this remains the case. The overall habitat conservation status has therefore been assessed as Unfavourable-Bad due to impaired Structure and Functions.
2.8.06 Overall trend in Conservation Status	The overall assessment trend is considered to be unknown owing to a lack of knowledge on the trends in condition.
3.1.03 Trend of surface area within the network	The trend is assessed as stable as there is unlikely to have been significant loss of this habitat within the SAC network.

Habitat code: 7140

Field label	Note
3.2 Conservation measures	The 2011 Habitat Regulations protects transition mires listed as qualifying interests in SACs by regulating any plans or projects than may impact negatively on the habitat. In addition, NPWS have compiled a list of Activities Requiring Consent (ARCs) that are only granted if they do not exert a negative impact on Qualifying Interests within an SAC. The 2010 Groundwater Regulations implement the Groundwater Directive (2006/118/EC) in Ireland. Transition mires are one of the habitat types on the EU WFD Register of Protected Areas (Annex I habitat types under the EU Habitats Directive) identified by NPWS as one of eleven priority groundwater dependent terrestrial ecosystems (GWDTEs). Priority GWDTE types are those that are most dependent on groundwater and priority sites are within the Natura 2000 network. The WFD requires Member States to prevent and remedy groundwater related damage (both quantitative and chemical) to groundwater dependent wetlands. Drainage or reclamation of wetlands (which includes fens) is controlled under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011. Permission is required from the relevant Local Authority where the area impacted by the works exceeds 0.1ha or the works may have a significant effect on the environment. Areas greater than 2ha require an EIS with the planning application. Works include installation of open drains or closed drains, opening of a watercourse, infilling with earth etc.

Transition Mires (7140)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
10-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7150

NAME: Depressions on peat substrates of the Rhynchosporion

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Black, K., Gallagher, G., O'Brien, P., Redmond, J., Barrett, F., Twomey, M. (2008) Dispelling myths: the true extent of recent peatland afforestation in Ireland. Coford Connects – Environment No.8. COFORD, Dublin.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

Fernández, F., Fanning, M., Mccorry, M., and Crowley, W. (2005) Raised bog monitoring project 2004-2005. Unpublished report, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. 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. 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. (2013c). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013d). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013e). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 14: Slieve League cSAC (000189), Co. Donegal. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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

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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. 8: Killarney National Park, Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Stallegger, M. (2008) Management of Natura 2000 habitats. 7150 Depressions on peat substrates of the Rynchosporion. The European Commission (DG ENV B2).

Sweeney, J., Albanito, F., Brereton, A., Caffarra, A., Charlton, R., Donnelly, A., Fealy, R., Fitzgerald, J., Holden, N., Jones, M. & Murphy, C. (2008) Climate change: Refining the impacts for Ireland. STRIVE Report. Environmental Protection Agency, Wexford.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	47200	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	47200
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	29.84		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	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. Whilst this figure is unknown it is deemed to be more than the current area due to declines in the intervening period.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	high importance (H)	N/A
hand cutting of peat (C01.03.01)	medium importance (M)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Erosion (K01.01)	low importance (L)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	high importance (H)	N/A
hand cutting of peat (C01.03.01)	medium importance (M)	N/A
mechanical removal of peat (C01.03.02)	high importance (H)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
Erosion (K01.01)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats: modelling (2)

2.7 Complementary Information

2.7.1 Species

Carex limosa

Carex panicea

Drosera spp. (counted separately)

Eleocharis multicaulis

Eriophorum angustifolium

Juncus bulbosus

Menyanthes trifoliata

Narthecium ossifragum

Rhynchospora spp. (count separately)

Sphagnum spp. (count separately, exclude S. fallax)

2.7.2 Species method used	During the NSUH typical species within 7150 habitat were assessed as an assemblage at the monitoring stop level. At each monitoring stop a minimum of five indicator species was required. As this was a baseline survey, trends for the assemblage and for individual species were not assessed. During the Raised Bog Monitoring Project 2004-2005 (Fernández et al. 2005) an overall assessment of the 7150 habitat at each site was given based on the occurrence of Rhynchospora alba and/or Rhynchospora fusca.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network = 15.06 km2 Area of habitat outside SAC network = 14.79 km2 Area of habitat within SAC network that is QI = 9.24 km2 Area of habitat within SAC network that is not QI= 5.82 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	15.06	max	15.06
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative	medium importance (M)	Both	Enhance
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	No effect
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Regulation/ Management of hunting and taking (7.1)	Administrative	low importance (L)	Inside	Enhance
Regulating/Management exploitation of natural resources on land (9.1)	Administrative	medium importance (M)	Both	Enhance
Measures needed, but not implemented (1.2)	Administrative	medium importance (M)	Both	Enhance

Field label	Note
Habitat code: 7150	
0.2 Habitat code	Habitat 7150 in an Irish blanket bog context has been defined by Perrin et al. (2013a). This habitat consists of open vegetation on peat which is characterised by the abundance of Rhynchospora alba or Rhynchospora fusca. It can occur in both active and degraded blanket bogs and raised bogs on wet peat substrates on the margins of pools and hollows and also as a pioneer community in areas of disturbed peat such as peat-cuttings. It is typically a lowland community. Other typical species include Sphagnum spp., Drosera spp., Menyanthes trifoliata and Eriophorum angustifolium. The habitat is reported in Stallegger (2008) as occurring in the fluctuation zone of oligotrophic pools with sandy, slightly peaty substrates but it has not been recorded in this context in Ireland to date. It is also reported in Stallegger (2008) as occurring on wet heath but this has been recorded exceedingly rarely during the NSUH.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat is concentrated in the west and the midlands but is absent from the east and south east.
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile. To create the polygon shapefile the following data sources were used: 7130 Blanket bog distribution shapefile, 7110 Active raised bog distribution shapefile, 7120 Degraded raised bog distribution shapefile and the distribution of Rhynchosporpora alba and R. fusca as given in Preston et al. (2002). The distribution of raised bog habitats were used to indicate the extent of 7150 habitat in relation to raised bogs. To these areas the locations where 7130 Blanket bog occurs in correlation with hectad records of Rhynchosporpora alba or R. fusca were added. Two outlying records of degraded raised bog from Co. Meath (O06) and southern Carlow (S73) were omitted. The Habitat Assignment Project which notes the qualifying interest of SACs and other habitats which occur in SACs, NHAs and cNHAs was also reviewed.
1.1.03 Year or period	The latest data used is from the Phase 3 of the NSUH and the Raised Bog survey, both carried out in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project which contribute to the distribution of 7130 Blanket bog are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]

Field label	Note
Habitat code: 7150	
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at eight of the fourteen sites surveyed (Roche et al. 2011, 2012, Perrin et al. 2011, 2012, 2013b,c,d,e). The Raised Bog Monitoring Survey was completed in 2012 but the results from this survey were unavailable, as such reference is made in this report to the Raised Bog Monitoring Project 2004-2005 (Fernández et al. 2005). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Sweeney et al. (2008) consider the vulnerability of habitats to climate change. Black et al. (2008) assesses the afforestation of peat. Stallegger (2008) is a guide to the management of 7150. The remaining references are described in section 1.1.2.
2.3.02 Method used - Range	Accurate national mapping for this habitat has not been conducted. The accuracy of the range is dependent on the accuracy of distributions for habitats 7110, 7120 and 7130 and the records for Rhynchospora spp., and the validity of the assumptions made.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 60,900 km2. The use of different data sources contributed to the change in range.
2.3.10 c) Reason for change - use of different method	The use of the range tool contributed to the change in range.
2.4.02 Year or period	The latest data used is from the NSUH and the Raised Bog survey, both carried out in 2012. The dates of the original survey work for the CPU Habitats and Habitat Assignment Project which contribute to the distribution of 7130 Blanket bog are unknown but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Following correspondence with NPWS, 7150 is considered to occur on 10% of all 7110 Active raised bog habitat and 2% of all 7120 Degraded raised bog habitat. Using the mean percentage cover values for habitats 7130 and 7150 at NSUH sites, it was calculated that the area of 7150 in the upland areas is approximately 0.8% of the area of 7130 Blanket bog. 0.8% of national area of 7130 Blanket bog (2286.784181 km2) = 18.294 km2 10% of national area of 7110 Active Blanket bog (19.55 km2) = 1.955 km2 2% of national area of 7120 Degraded raised bog (479.89 km2) = 9.596 km2 Total area = 29.84 km2
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.

Field label	Note
Habitat code: 7150	
2.4.05 Short-term trend - Trend direction	The NSUH reported losses of 7130 Blanket bog in the lowlands at the sites surveyed due chiefly to turf-cutting. Outside the SAC network losses in area will have been much higher due to impacts including afforestation, commerical and domestic peat cutting and windfarm development. Losses of raised bog habitat have also occurred through afforestation, commerical and domestic peat cutting. As 7120 Active raised bog is considered to comprise 10% 7150 Rhynchosporion depressions while 7110 Degraded raised bog supports only 2% the loss of any 7120 Active raised bog habitat would ultimately also result in the loss of 7150 habitat. Drying out of active raised bog may result in short-term increases in Rhynchosporion depressions though the continued drying of these areas will result in their eventual disappearance.
2.4.07 Short-term trend - Method used	Accurate figures for determining trend are not available.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	NPWS (2007) reported the area of habitat 4010 as unknown.
2.5 Main pressures	Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing or trampling are high, is problematic within this habitat. Small amounts of afforestation with non-native conifers have been recorded within SACs by the NSUH but this impact is likely to be much more prevalent outside of designated areas. Afforestation of peatlands in Ireland was estimated as c. 4,000 ha per year in 2006 (Black et al. 2008). Turf cutting of blanket bog by hand has been recorded within the majority of cSACs surveyed by the NSUH but this impact is likely to be much more prevalent outside of designated areas. Unregulated mechanised turf cutting on blanket bog and raised bogs has been recorded within several cSACs. This highly destructive impact is also likely to be much more prevalent outside of designated areas. Campylopus introflexus is the most frequent invasive non-native species within this habitat but, unless it forms extensive carpets which can suppress heather re-establishment, it is considered a mild or temporary invasive as it does not have long-terms effects on biodiversity. The more pernicious invasive non-native species Rhododendron ponticum is becoming established at a small number of sites. Burning was recorded within this habitat at both blanket bog and raised bog sites. “Water abstractions from groundwater” refers to the digging of drainage ditches. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact (C. Douglas pers. comm.). Pressures were recorded during the NSUH. Sheep grazing is widespread within the sites surveyed by the NSUH and, where levels of grazing or trampling are high, is problematic within this habitat.

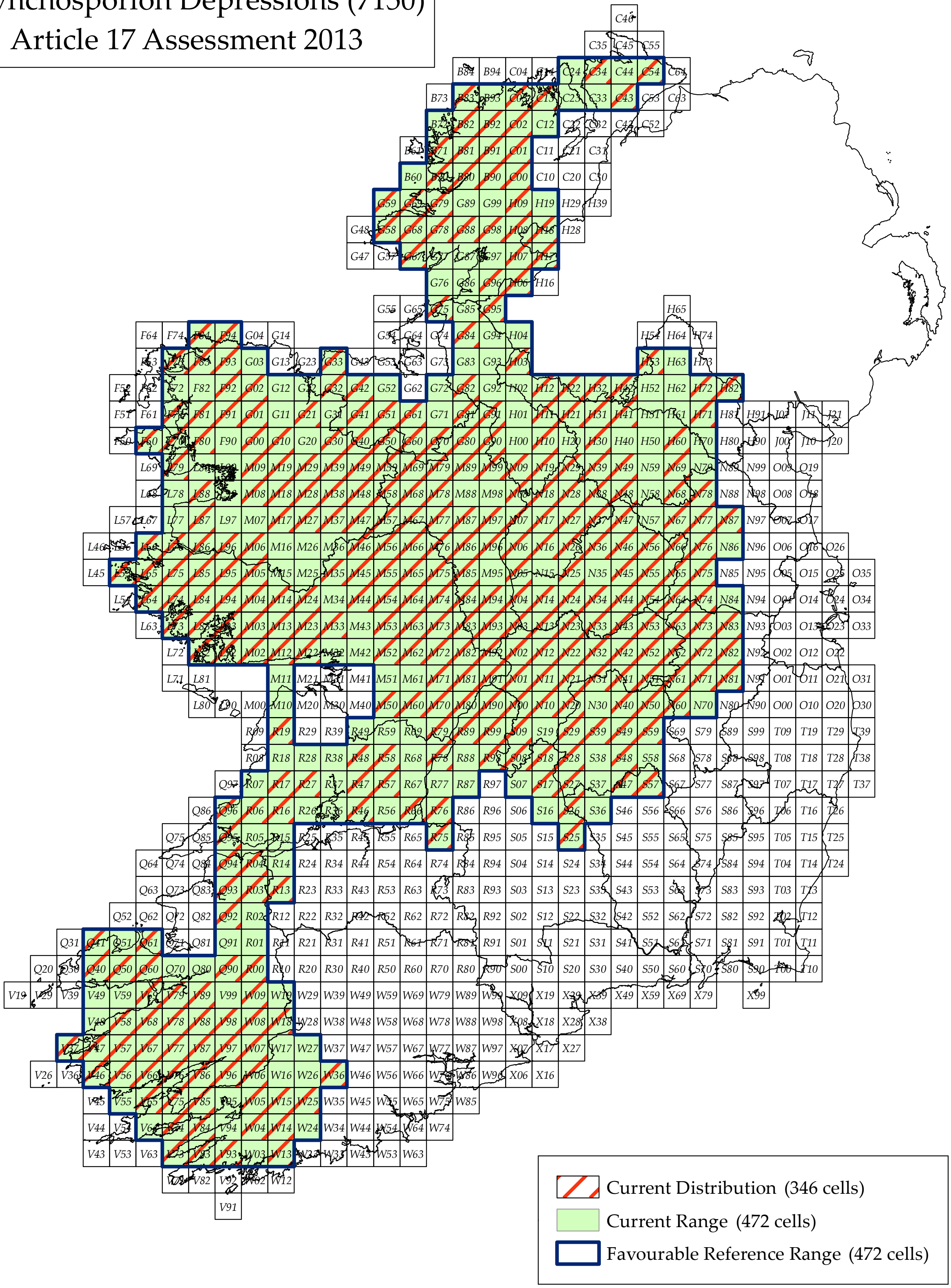
Field label	Note
Habitat code: 7150	
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. The Raised Bog Monitoring Project 2004-2005 (Fernández et al. 2005) was also reviewed with relevant information incorporated. Information relevant to this habitat was utilised where possible from the NPWS Site Inspection Report database; some of the impacts recorded in this database were not specific enough. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	Threats were recorded during the NSUH. The list of threats is the same as the list of pressures with the addition of climate change.
2.6.01 Method used - Threats	Sweeney et al. (2008) modelled changes in suitable climatic area for both upland and lowland blanket bog in Ireland.
2.7 Complementary information	The list of typical species is based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement.
2.7 Complementary information	The list of typical species was based on the list presented in the UK's JNCC Common Standards Monitoring and was adapted for Irish vegetation communities using expert judgement.
2.7.02 Typical species - method used	At each monitoring stop at least five typical species were required to be present.

Field label	Note
Habitat code: 7150	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover several important blanket bog sites for this habitat in Ireland. Twenty-seven monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. The main reasons for failure were disturbed bare ground, drainage and lack of indicator species. 1. No. of positive indicator species present ≥ 5 (3.7%) 2. Cover of Rhynchospora spp. ≥ 10% (0.0%) 3. Cover of potentially dominant species each <35% (3.7%) 4. Cover of negative indicator species <1% (0.0%) 5. Cover of non-native species in relevé <1% (0.0%) 6. Cover of scattered native trees and scrub <10% (0.0%) 7. Crushed or pulled up Sphagnum <10% of Sphagnum cover (0.0%) 8. Browsing of ericoids, Empetrum nigrum and Myrica gale <33% (0.0%) 9. No signs of burning into moss/lichen layer or exposure of beat due to burning (0.0%) 10. No signs of burning inside sensitive areas (0.0%) 11. Cover of disturbed bare ground in relevé <10% (18.5%) 12. Cover of disturbed bare ground in local vicinity <10% (25.9%) 13. Area showing signs of drainage resulting from trampling, tracks or ditches <10% (8.0%) 14. Cover of erosion gullies and eroded areas within the greater bog mosaic <5% (8.0%) During the Raised Bog Monitoring Project 2004-2005 (Fernández et al. 2005) an overall assessment of the 7150 habitat at each site was given but monitoring stops specifically for 7150 were not recorded.
2.7.04 Structure and functions - Methods used	The NSUH assessed structure and functions at a monitoring stop level, using criteria to assess vegetation composition, vegetation structure and physical structure. Criteria were adapted from the UK's JNCC Common Standards Monitoring using expert judgement. As the NSUH primarily assesses cSACs and is currently incomplete, expert judgement was used to extrapolate results for this habitat in the rest of the country.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is less than the FRV for area but not more than 10% below the FRV. The FRV may change following future fieldwork.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Expert judgement determines ongoing decline due to peat cutting, drainage, afforestation, burning, overgrazing etc.

Field label	Note
Habitat code: 7150	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 27 monitoring stops recorded in this habitat by the NSUH, 8 stops (29.6%) failed which would suggest an assessment of U2 – Bad. However of the 47 sites which were assessed during the Raised Bog Monitoring Project 2004-2005 (Fernández et al. 2005), 46 were given an overall assessment of FV - Favourable. An assessment of U1 – Inadequate is therefore made. An assessment of FV – Favourable was made for the last reporting round (NPWS 2007); there is no evidence of an actual decline.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the main impacts on this habitat within blanket bog is disturbance, an improving trend in this regard would be suggested due to the Commonage Framework Plans (CFP). However, this improvement is likely to be cancelled out and exceeded by ongoing deleterious effects such as peat cutting, erosion, drainage and burning. A "-declining" qualifier is therefore tentatively applied. Note, also that the CFP does not provide data specific to habitats 7130 or 7150 and has had limited monitoring. The NSUH is a baseline survey and so has provides no data on trends. There is no data on the trend for this habitat within raised bogs. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007).
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have poor prospects but none have bad prospects, future prospects is assessed as U1 –Inadequate. An assessment of FV – Favourable was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / <FRV / -declining / <FRV / Poor S&F / <FRV / -declining / <FRV / Poor
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one or more of the parameters are declining and none are improving, the qualifier is assessed as –declining.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U1 – Inadequate but none are U2 - Bad, the overall assessment is U1 – Inadequate.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was FV – Favourable.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Field label	Note
Habitat code: 7150	
3.2 Conservation measures	Approximately half of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation (A. Bleasdale pers. comm.). In some areas that were in particularly bad condition additional measures have been required, for example, the off-wintering of stock in the Twelve Bens cSAC, Maumturks cSAC and the Owenduff-Nephin SPA (2.1). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere. Formulation of a National Peatland Strategy is currently underway among relevant stakeholders and with public consultation will help identify priorities and strategies for ecologically sensitive peatland management including the issue of peat extraction in Natura 2000 sites (9.1). All applications for afforestation occurring within designated sites are referred to NPWS. EIAs are required for plantations greater than 50 ha, and consultation with local authorities is required in relation to afforestation on areas in excess of 25 ha (3.0). Areas of Annex I habitats not covered by these criteria are particularly vulnerable to afforestation. This measure is rated as 'no effect' as adaptation of forestry regulations is required to enhance protection of this habitat. Regulated, small-scale heather burning can produce a diverse structure of heather of high conservation value. However, most heather burning is conducted too frequently, in a poorly or uncontrolled fashion over large areas, probably with the aim of promoting grassland for grazing. Burning is probably less appropriate management for blanket bog than for dry heath and areas of Rhynchosporion depression are unlikely to be targeted for burning however it has been recorded as a threat to the status of this habitat. National guidelines and regulation on appropriate heather burning procedures are required (1.2). In areas of commonage, heather burning should be regulated at a local level. Positive conservation measures in Killarney National Park include culling of deer (7.1).

Rhynchosporion Depressions (7150)
Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7210	
NAME: Calcareous fens with Cladium mariscus and species of the Caricion davallianae	

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2004-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	

ANON 2010. County Meath Wetlands and Coastal Habitat Survey. A Report prepared for Meath County Council and the Heritage Council.
ATKINS. 2008. Mayo Habitats Survey. A Report by Atkins for Mayo County Council.
BARRON, S. J. & PERRIN, P. M. 2010. Review and amendment of GIS mapping for blanket bog NHAs. A report submitted to the National Parks and Wildlife Service.
CONAGHAN, J. & FULLER, J. 2004. An ecological survey of habitat cover in the Shannon/Newmarket-on-Fergus region of South Co. Clare. Unpublished report and GIS commissioned by Clare County Council.
CRUSHELL, P. & FOSS, P. 2008. The County Clare Wetlands Survey: Desk Study and GIS Preparation. A Report prepared for Clare County Council, Ireland.
CRUSHELL, P., FOSS, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Kildare Wetland Survey. Part I: Main Report. Report prepared for Kildare County Council and The Heritage Council.
FOSS, P. 2007. Calcareous fens with Cladium mariscus and species of the Caricion davaliianae (7210) conservation status assessment. Unpublished report to the National Parks and Wildlife Service.
http://www.npws.ie/publications/euconservationstatus_NPWS_2007_Cons_Ass_Backing_V3.pdf
FOSS, P. J. & CRUSHELL, P. 2012. Wetland Survey County Monaghan II. Report prepared for Monaghan County Council and The Heritage Council.
FOSS, P., CRUSHELL, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council.
HICKEY, B. & TUBRIDY, M. 2009. County Laois Habitats Survey (Phase V). A Report prepared for the Laois Heritage Forum.
HURLEY, C. 2003. Habitat mapping, evaluation of semi-natural grassland and marsh and conservation recommendations for the north-west region of Ennis and environs. Unpublished MSc Thesis, Ecosystem Conservation and Landscape Management, NUI Galway.
KEARNEY, P. 2008. Survey and mapping of habitats from Cratloe to Parteen, South East Clare. A Report by RPS for Clare County Council and The Heritage Council.
KEARNEY, P. 2010. Habitat Mapping of Habitats in County Cavan. Survey Findings Report. A Report by RPS for Cavan County Council and The Heritage Council.
KILROY, G., DUNNE, F., RYAN, J., O`CONNOR, A., DALY, D., CRAIG, M., COXON, C., JOHNSTON, P. & MOE, H. 2008. A framework for the assesment of groundwater

dependent terrestrial ecosystems under the water framework directive (2005-W-FS-5). Associated datasets and digital information objects connected to this resource are available at Secure Archive For Environmental Research Data (SAFER) managed by the Environmental Protection Agency Ireland. http://erc.epa.ie/safer/resource?id=b5799c70-224b-102c-b381-901ddd016b14.
KIMBERLEY, S. 2013. Conservation status assessment for three fen habitat types. Unpublished report to the National Parks and Wildlife Service.
MERC. 2007. Audit of Biological Datasets for Counties Cavan and Roscommon as cited in Kearney (2010).
NATURA 2005. Galway City Habitat Inventory. A Report prepared by NATURA Environmental Consultants on behalf of Galway City Development Board.
NATURA 2007. Westmeath Fen Study. Draft Final Report prepared for Westmeath County Council and The Heritage Council by NATURA Environmental Consultants.
PERRIN, P.M., BARRON, S.J., ROCHE, J.R. and O`HANRAHAN, B. 2010. Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 1.0. Irish Wildlife Manuals, No. 48. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Data extracted from Phase 3 of the National Survey of Upland Habitats.
TUBRIDY, M. 2006. Heritage Surveys of Vulnerable Landscape. A Report for Clare County Council.
WHITE YOUNG GREEN 2008. Galway Wetlands Scoping Study. Final Report prepared for Galway City Council by White Young Green, Dublin.
WILSON, F. & FOSS, P. J. 2011. The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council.
WILSON, F. 2009. County Sligo Wetland Survey. A Report prepared for Sligo County Council and The Heritage Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	17200	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	17200
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range as there is no evidence of a decline since the Directive came into force. The FRR is considered to encompass all ecological variation of the habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	90.34		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	
	operator	more than (>)
	unknown	No
	method	Although losses of habitat area are considered to have occurred since the Directive came into force the magnitude of the decline is unknown. The FRA is set as > than the current area. It is unlikely that >10% of the resource has been lost since 1994. An additional 1-10% of the current area is considered adequate to ensure the long-term viability of the habitat.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse pollution to surface waters due to transport and infrastructure without connection to canalization/sweepers (H01.06)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A
Peat extraction (C01.03)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
agricultural intensification (A02.01)	low importance (L)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Peat extraction (C01.03)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

2.6.1 Method used – threats

expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Cladium mariscus

Anagallis tenella

Aneura pinguis

Bryum pseudotriquetrum,

Calliergonella cuspidata

Campylium stellatum

Carex dioica

Carex echinata

Carex hostiana

Carex nigra

Carex panicea

Carex pulicaris

Carex viridula ssp. Brachyrrhyncha

Carex viridula ssp. Oedocarpa
Cirsium dissectum
Ctenidium molluscum
Dactylorhiza incarnata
Dactylorhiza traunsteineri
Drepanocladus cossonii
Drepanocladus revolvens
Eleocharis multicaulis
Eleocharis quinqueflora
Epipactis palustris
Eriophorum latifolium
Fissidens adianthoides
Galium palustre
Hydrocotyle vulgaris
Juncus articulatus
Juncus bulbosus
Juncus subnodulosus
Mentha aquatica
Molinia caerulea
Palustriella commutata
Parnassia palustris
Pinguicula vulgaris
Ranunculus flammula
Schoenus nigricans
Scorpidium scorpioides
Selaginella selaginoides
Succisa pratensis
Blindia acuta

2.7.2 Species method used	The list of typical species is based exclusively on the previous conservation assessment report for the habitat (Foss, 2007). This list was derived using a number of publications on Irish fen vegetation (O'Criodain and Doyle 1994, 1997, Doyle and O'Criodain 2003, White and Doyle 1982). No assessment of typical species have been undertaken to date, apart from as a tool to identify the habitat.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	13.52 km2 of this habitat is listed as a Qualifying Interest within the SAC network.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	unknown (x)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status		Bad (U2)
2.8.6 Overall trend in Conservation Status		unknown (x)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	59.79	max	59.79
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Other wetland-related measures (4.0)	Administrative	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal	high importance (H)	Both	Enhance
Managing water abstraction (4.3)	Legal	high importance (H)	Both	Enhance
Measures needed, but not implemented (1.2)		high importance (H)	Both	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 7210	
0.1 Member State	Ireland
0.2 Habitat code	This priority habitat type typically occurs where C. mariscus stands are in contact with Caricion davallianae or other Phragmition species. In Ireland, the habitat often occurs where monodominant or species-poor stands of C. mariscus merge with Schoenetum nigricantis. The habitat may also occur as transition zones between C. mariscus stands and other species-rich alkaline fen vegetation alliances such as Campylio-Caricetum dioicae, Juncetum subnodulosi. The habitat can occur in the absence of a distinct, dense stand of C. mariscus as areas of species-rich alkaline fen vegetation in which C. mariscus is dominant. This habitat type is thought to typically occur in occur in lowland topogenous basins associated with limestone groundwater bodies with a karstic or poorly productive flow regime. The habitat can also occur in other calcareous wetland types such as upland and lowland base-rich flushes, along the fringes of calcareous lakes and within turloughs.
1.1.02 Method used - map	A baseline, national field survey of fen habitats had not been conducted in Ireland to date. The habitat distribution was based to a large extent on the NPWS Fen Study Database compiled as part of the 'Study of the extent and conservation status of springs, fens and flushes in Ireland' (Foss, 2007). Additional sites were extracted from a variety of relatively recent field and desk-based surveys (Conaghan & Fuller 2004, Natura 2005, Tubridy, 2006, Natura 2007, MERC 2007, Kearney 2008, Atkins 2008, Kilroy et al. 2008, Crushell & Foss 2008, Hickey & Tubridy 2009, Wilson 2009, Perrin et al. 2010, Kearney 2010, ANON 2010, Wilson & Foss 2011, Foss & Crushell 2012, Foss et al. 2012 and Crushell et al. 2012).
1.1.03 Year or period	Numerous desk-based and field fen surveys have been conducted between 2004 and 2012; please note that data collated as part of the desk studies may have come from sources older than the publication date.
1.1.04 Additional distribution map	Species-rich Cladium mariscus fen locations as per Section 1.1.2 were intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	A range map was derived following the standardised methods using the Article 17 Range tool.
2 Biogeographical level	ATL
2.2 Published sources	Kimberley (2013) summarises current knowledge on this habitat. The previous conservation status assessment (Foss, 2007) was based on results generated from a desk study of the national extent of springs, fens and flushes. Numerous desk-based and field fen surveys have been conducted in recent years. Two desk studies have improved the geospatial information for fens occurring within blanket bogs (Barron and Perrin, 2011) and within SAC complexes (Kilroy et al. 2008). County wetland/habitat surveys of varying detail have been conducted within 11 counties (Hurley 2003, Conaghan & Fuller 2004, Natura 2005, Tubridy 2006, MERC 2007, Natura 2007, Atkins 2008, WYG 2008, Crushell & Foss 2008, Kearney 2008, Hickey & Tubridy 2009, Wilson 2009, Anon 2010, Kearney 2010, Wilson & Foss 2011, Crushell et al. 2012, Foss & Crushell 2012).
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	The default trend period was used.

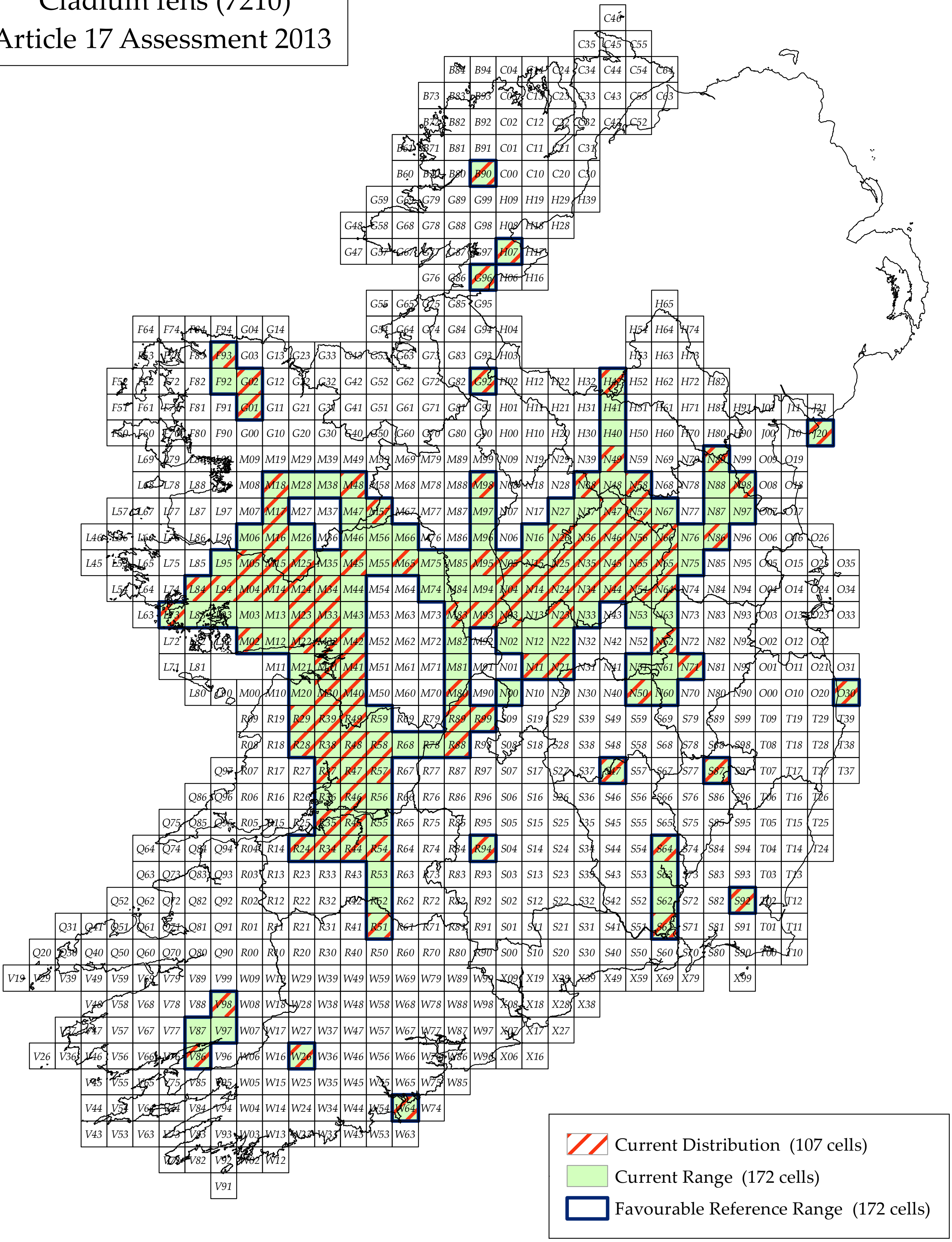
Field label	Note
Habitat code: 7210	
2.3.04 Short term trend - Trend direction	The range trend was assessed as stable. There is no evidence to suggest that there has been a significant decline in the habitat distribution over the past 12 years. In the absence of a national field survey of fens, the current distribution and range maps provide a more refined estimate of the national habitat extent; however they may significantly underestimate the national resource.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.
2.3.10 c) Reason for change - use of different method	Discrepancies between the previous and current distribution and range are mainly attributed to differences in the mapping protocols. The previous habitat distribution map was generated by intersecting the entire SAC boundary with the 10km grid in cases where points in the NPWS Fen Survey Database occurred within non-extensive designated areas with a digitised site boundary. This process overestimated the extent of habitat in these cases. The NPWS Fen Study Database shapefile contained sites known to contain Cladium fen and sites thought to possibly contain Cladium fen. The latter sites were excluded from the current distribution owing to the high degree of uncertainty associated with the data. The 2007 distribution map also included all reported records for Cladium mariscus from the Botanical Society of the British Isles 10km Flora distribution map. The presence of C. mariscus does not equate to species-rich Cladium fen (7140) and some of these records are decades old.
2.4.01 Surface area	The extent of species-rich Cladium fens within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat.
2.4.02 Year or period	The area figures were derived for the data surveyed and collated between 2004 and 2012. Some of the surveys may have been undertaken before the period specified.
2.4.03 Method used - Area covered by habitat	See 2.4.1
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	The trend in area is considered to be declining. This is due to landfill and land reclamation being noted as an ongoing pressure on Alkaline fen (Kimberley, 2013); as Cladium fen often occurs in transition with Alkaline fen these pressures are therefore considered to be relevant to this habitat.
2.4.07 Short-term trend - Method used	The trend estimate is based on expert opinion of the data sources available since there are no field-validated baseline data with which to compare the present area.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.

Field label	Note
Habitat code: 7210	
2.4.13 c) Reason for change - use of different method	There are two main reasons why the current maximum surface area estimate is significantly greater than the previous estimate given the reduced habitat distribution. Firstly, estimates of the area of species-rich Cladium fen habitat were outstanding for many sites in the NPWS Fen Survey Database at the time of the previous conservation assessment and the estimated surface area (14.68km2) was regarded as a minimum in the absence of a detailed field survey of fens. Secondly, the current conservation assessment assigned an estimated area to sites recorded in the NPWS Fen Survey Database, included in the habitat distribution and lacking an area estimate. The estimated area was the median area of those sites (113500 m2 or 11.35 ha) in the NPWS Fen Survey Database with an estimated habitat area and also included in the current habitat distribution.
2.5 Main pressures	The ranked list of pressures was based on site-specific pressures recorded during six county wetland surveys (Atkins 2008, Wilson 2009, Wilson and Foss 2011, Foss and Crushell 2012, Crushell et al. 2012); general assessments of pressures impacting on habitat as a whole (Natura 2005, Natura 2006, Natura 2007, WYG 2008, Crushell & Foss 2008); pressure summaries provided by NPWS for SACs where 7210 species-rich Cladium fens are a Qualifying Interest; and expert judgement. See Kimberley (2013) for further details. Pressures noted prior to the reporting period were included due to the lack of national data on this habitat; they are considered to represent ongoing pressures.
2.6 Main threats	There is no evidence to suggest the decline of any of the listed pressures; therefore they also constitute threats. M01 (Changes in abiotic conditions) is added as a threat as changes in precipitation patterns and frequency driven by climate change will likely lead to alterations to the hydrological regimes of fen habitats.
2.7.04 Structure and functions - Methods used	The key structures and functions of species-rich Cladium fens are a stable, high water table, a calcareous, low nutrient water supply and controlled mowing and/or grazing. There is currently no consistent, broad-scale assessment or monitoring of species-rich Cladium fen structures and functions in Ireland however indicators of fen structures and functions are under development based on an improved understanding of Irish fen ecological requirements and of ecological responses to pressures. As groundwater-dependent wetlands, there have been significant attempts during the reporting period to assess the influence of groundwater related pressures on the ecological condition of species-rich Cladium fen sites within the SAC network (Kilroy et al. 2008, Curtis et al. 2009, Kimberley & Coxon 2013, Kimberley 2013). A recent field survey of lowland alkaline fen sites used vegetation-based positive and negative nutrient indicators to identify sites where there is evidence of a nutrient impact that may be related to groundwater nutrient inputs. 14% of the alkaline fen sites with species-rich Cladium fen were in poor ecological condition. Disparate county wetland surveys provide valuable site-specific information on vegetation composition, pressures and ecological value however overall assessments of site structures and functions and ecological condition are lacking. Assessments of damage are therefore used here as a proxy for assessments of site ecological condition. The most comprehensive, recent county-level field surveys of fens (Wilson 2009, Wilson & Foss 2011, Foss et al. 2012, Foss & Crushell 2012, Crushell et al. 2012) report that a majority of fen habitat types are damaged from human activities. Based on the limited evidence presented above, it can be stated with a moderate level of confidence that greater than 25% of the national resource of species-rich Cladium fen has impaired structure and functions.

Field label	Note
Habitat code: 7210	
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range is assessed as 'Favourable' as there is no evidence of a significant decline in the range since the Directive came into force.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The extent of species-rich Cladium fens within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat. There is indirect evidence of ongoing losses in Area since the Directive came into force, however these losses are unlikely to be at a rate greater than 1% per annum or more than 10% below the FRA, therefore Area is assessed as Unfavourable –inadequate.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	As losses are considered to be ongoing the qualifier is set as declining, however Regulations referred to in 3.2 should halt this trend.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structures and functions were assessed in 2007 as 'Unfavourable-bad' owing the broad range of pressures acting on the habitat. Structures and functions are again assessed as Unfavourable –bad based on limited quantitative evidence that indicates that a significant proportion (>25%) of the national resource has impaired structures and functions. A national baseline fen survey has not been conducted to date in Ireland and disparate county level surveys are the main source of new information on species-rich Cladium fens. These surveys however use different habitat classification and mapping methods and there is still a lack of comparable data on the structures and functions of the habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structures & functions is assessed as unknown in the absence of a baseline survey of Cladium fens since the last reporting period.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Species-rich Cladium fens are particularly vulnerable to land drainage and water abstractions within the immediate locality and wider catchment areas. Land abandonment can also lead to loss of species-rich communities. Future prospects have been assessed as 'Unfavourable Bad given that a significant proportion (> 25%) of the habitat is damaged (cf Section 2.7.4) coupled with the fact that there are no restoration measures in place.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The trend for future prospects are considered to be improving due to additional protection afforded under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011 and the Groundwater Regulations 2010 (see 3.2 for further detail).
2.8.05 Overall assessment of Conservation Status	Range is assessed as Favourable as there is no evidence of a decline since the Directive came into force. Ongoing losses of habitat Area resulted an Unfavourable- inadequate declining assessment. Structure and Functions and Future Prospects were assessed as Unfavourable-Bad based on limited evidence that indicates that a significant majority (>25%) of the national resource has impaired structures and functions. The Future Prospects for the habitat are improved since previous conservation assessment due to recently implemented regulations that afford wetlands a higher level of protection. Conservation of species-rich Cladium fen in Ireland is compromised by the lack of a definitive vegetation classification or formal description of the habitat as it occurs in Ireland and of accurate geospatial data. The 2007 conservation assessment cited a lack of reliable, comparable data as a major hindrance for accurately assessing the conservation status of the habitat as a whole and this remains the case. The overall habitat conservation status has been assessed as Unfavourable-Bad due to impaired Structure and Functions.

Field label	Note
Habitat code: 7210	
2.8.06 Overall trend in Conservation Status	The overall assessment trend is considered to be unknown owing to a lack of knowledge on the trends in condition.
3.1.03 Trend of surface area within the network	The trend is assessed as stable as there is unlikely to have been significant loss of this habitat within the SAC network.
3.2 Conservation measures	The 2011 Habitat Regulations protects species-rich Cladium fens listed as qualifying interests in SACs by regulating any plans or projects than may impact negatively on the habitat. In addition, NPWS have compiled a list of Activities Requiring Consent (ARCs) that are only granted if they do not exert a negative impact on Qualifying Features within an SAC. The 2010 Groundwater Regulations implement the Groundwater Directive (2006/118/EC) in Ireland. Cladium fens are one of the habitat types on the EU WFD Register of Protected Areas (Annex I habitat types under the EU Habitats Directive) identified by NPWS as one of eleven priority groundwater dependent terrestrial ecosystems (GWDTEs). Priority GWDTE types are those that are most dependent on groundwater and priority sites are within the Natura 2000 network. The WFD requires Member States to prevent and remedy groundwater related damage (both quantitative and chemical) to groundwater dependent wetlands. Drainage or reclamation of wetlands (which includes fens) is controlled under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011. Permission is required from the relevant Local Authority where the area impacted by the works exceeds 0.1ha or the works may have a significant effect on the environment. Areas greater than 2ha require an EIS with the planning application. Works include installation of open drains or closed drains, opening of a watercourse, infilling with earth etc. The lack of conservation measures pertaining to active within site management at Cladium fen sites presents a significant threat to the long-term viability of the habitat.

Cladium fens (7210)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
10-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7220	
NAME: Petrifying springs with tufa formation (Cratoneurion)	

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Lyons, M.D. and Kelly, D.L. (2013) Conservation status assessment for petrifying springs. Unpublished report to National Parks and Wildlife Service.
Foss, P. (2007) Petrifying springs with tufa formation (Cratoneurion) (7220) conservation status assessment. Unpublished report to National Parks and Wildlife Service.
http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Cons_Ass_Backing_V3.pdf
Heery, S. (2007) A survey of tufa-forming (petrifying) springs in Slieve Bloom, Ireland. Unpublished report to Offaly and Laois County Councils.
Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013). 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. (2013). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.
Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. Unpublished report to National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
Barron, S.J., Delaney, A., Perrin, P.M., Martin, J.R. & O'Neill, F.H. (2010) National survey and assessment of the conservation status of Irish sea cliffs. Irish Wildlife Manuals. Unpublished report to National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
Crushell P., Foss, P., O'Loughlin, B. & Wilson, F. (2012) County Kildare Wetland

Survey 2012. Unpublished report to Kildare County Council & The Heritage Council.
Hickey, B. & Tubridy, M. (2009) Habitats Survey (Phase V) County Laois. Unpublished report to Laois County Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	13200	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	13200
	operator	N/A
	unknown	No
	method	The current range value is considered to be the petrifying spring baseline. There is no evidence for decline of range since the Directive came into force and there is no reason to assume that the area is not large enough to allow the long term survival of the habitat. Therefore, the current range is set as the Favourable Reference Range. This must be qualified by acknowledging that petrifying springs, which are often very small in surface area, are easily missed in field surveys. Minor extensions to the range will inevitably occur as more sites are recorded during fieldwork.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.139		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	0.139	
	operator	N/A	
	unknown	No	
	method	There is no evidence of decline in extent since the Directive came into force and therefore the current area is set as the Favourable Reference Area.	
2.4.13 Reason for change	Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Landfill, land reclamation and drying out, general (J02.01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
intensive grazing (A04.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
surface water abstractions for agriculture (J02.06.01)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	low importance (L)	N/A
missing or wrongly directed conservation measures (G05.07)	low importance (L)	N/A
continuous urbanisation (E01.01)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A
speleology (G01.04.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
other sport / leisure complexes (G02.10)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Landfill, land reclamation and drying out, general (J02.01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A
Trampling, overuse (G05.01)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
intensive grazing (A04.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
surface water abstractions for agriculture (J02.06.01)	low importance (L)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
intensive maintenance of public parks /cleaning of beaches (G05.05)	low importance (L)	N/A
missing or wrongly directed conservation measures (G05.07)	low importance (L)	N/A
continuous urbanisation (E01.01)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A

artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A
speleology (G01.04.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
other sport / leisure complexes (G02.10)	low importance (L)	N/A
groundwater pollution by leakages from waste disposal sites (H02.02)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

- Palustriella commutata
- Palustriella falcata
- Eucladium verticillatum
- Pellia endiviifolia
- Cratoneuron filicinum
- Bryum pseudotriquetrum
- Didymodon tophaceus
- Festuca rubra
- Carex panicea
- Equisetum telmateia

2.7.2 Species method used	Typical species were selected by analysing relevé data for petrifying springs (114 samples) as described by Lyons & Kelly (2013). Deviations from sites of high conservation value were assessed by examining the diversity and richness of characteristic species at each habitat sub-type (e.g. woodland, coastaletc).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	A countrywide survey is in progress as part of a PhD project entitled 'The Flora and Conservation Status of Petrifying Springs in Ireland' . Findings to date are presented in Lyons & Kelly (2013). 0.089 km2 of the habitat is listed as a qualifying interest within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A

2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.114	max	0.114
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Article 17 - HABITAT NOTES

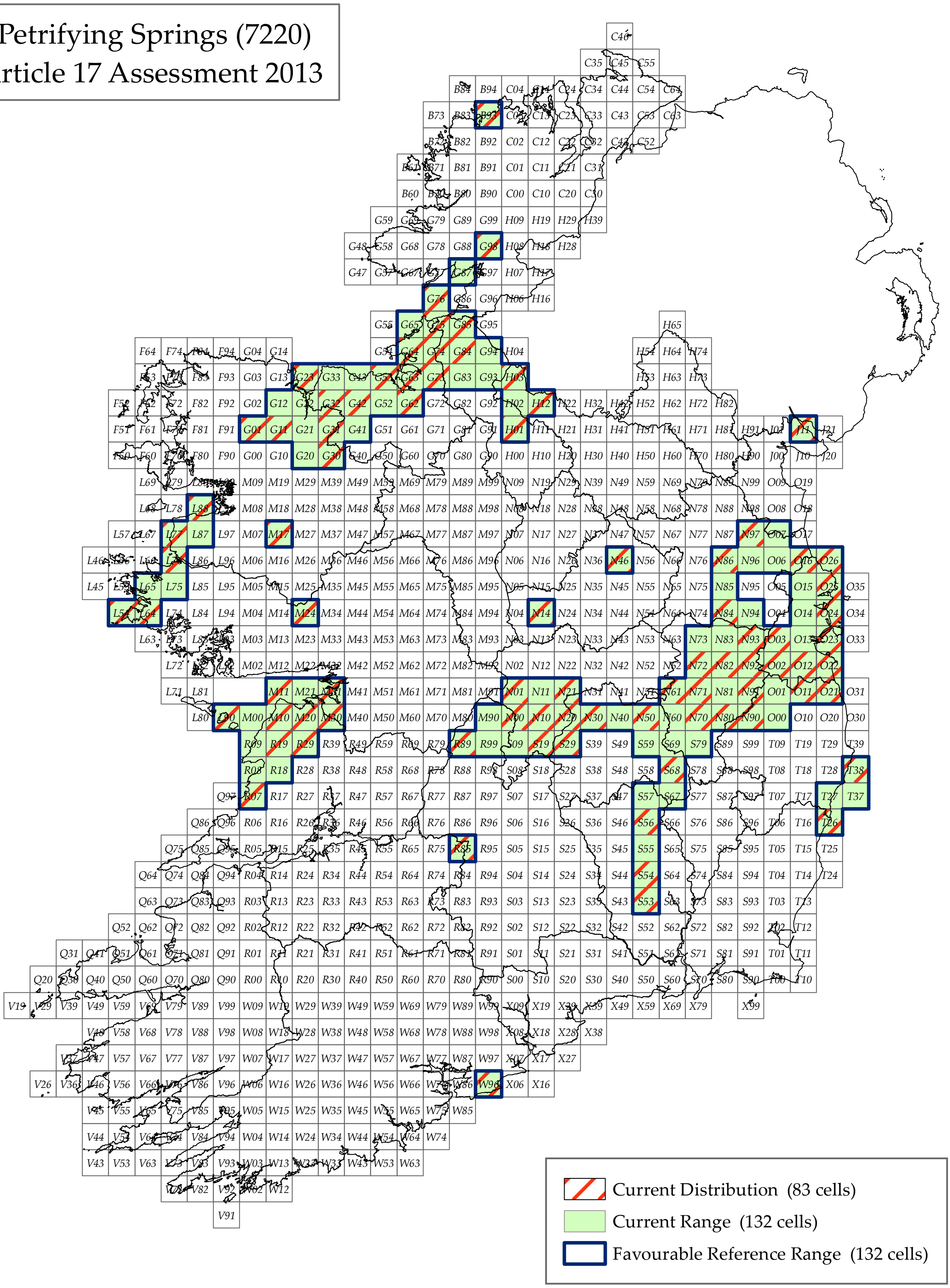
Field label	Note
Habitat code: 7220	
0.2 Habitat code	Petrifying Springs with Tufa Formation (Cratoneurion) have been defined as springs and seepages where tufa is actively deposited and where characteristic species of bryophytes are dominant or abundant. Characteristic bryophyte species are Palustriella commutata, P. falcata, Eucladium verticillatum, Pellia endiviifolia, Cratoneuron filicinum, Bryum pseudotriquetrum and Didymodon tophaceus. Characteristic vascular plants are Festuca rubra, Carex panicea and Equisetum telmateia. Petrifying springs may occur as (i) clearly defined spring heads with consolidated tufa, (ii) spring heads with an associated tufaceous flush, or (iii) seepage areas with tufa formation. The last-named type often occurs within alkaline fens and the vegetation forms a continuum between the two habitat types so that petrifying springs are not clearly demarcated from the surrounding fen vegetation. Three Subtypes of petrifying spring vegetation can be distinguished depending on the setting of the spring: Woodland springs; Coastal springs; and Springs of inland, open habitats. Springs occurring on the Benbulbin Range constitute a distinct group of high conservation value.
1.1.01 Distribution map	The distribution map referred to in 1.1.4 was transformed to the LAEA projection.
1.1.02 Method used - map	A countrywide survey of this habitat is in progress as part of a PhD project entitled 'The Flora and Conservation Status of Petrifying Springs in Ireland' (see Lyons & Kelly, 2013). This project has contributed 168 spring locations which have been validated in the field and yield a distribution of 60 x 10km squares. Additional sites were gleaned from recent field surveys. The National Survey of Upland Habitats (Perrin et al., 2013) contributed a further 8 x 10km squares to the distribution and other recent reports to NPWS and various local authorities (Moorkens & Killeen 2011, Crushell et al. 2012, Hickey & Tubridy 2009 and Baron et al. 2011) added another 8 x 10km squares. Seven more 10km squares were added to the distribution based on detailed information gathered from other experts, bringing the total number to 83.
1.1.03 Year or period	PhD site visits took place from 2009 – 2012; field data for other reported locations were collected between 2007 and 2012.
1.1.04 Additional distribution map	Petrifying spring locations as per Section 1.1.2 were intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	A range map was derived following the standardised methods using the Article 17 Range tool.
2.2 Published sources	Lyons & Kelly (2013) summarise current knowledge on this habitat in Ireland and report on the findings to date of the PhD project. Foss (2007) contains the results of a desk survey used to compile the previous conservation status assessment. Heery (2007) records locations and descriptions of petrifying springs in the Slieve Bloom Mts. Incidental records of Petrifying springs were recorded as part of the other surveys listed.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	See field 1.1.5.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The present survey constitutes the first comprehensive field survey of this habitat and provides a baseline for future monitoring of the habitat. Field evidence suggests that the distribution has been stable over the past 12 years.

Field label	Note
Habitat code: 7220	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The distribution reported in 2007 was derived from a desk survey based largely on the distribution of fens in Ireland and on records for Saxifraga aizoides and the bryophytes Palustriella commutata s.l. and Eucladium verticillatum. Petrifying springs do not necessarily coincide with fens and many of the bryophyte records lacked any information on habitat type and most date from the 1960's. Since 2007, extensive field surveys have taken place and these have refined knowledge of this habitat considerably. Sites included in the previous assessment for which no detailed substantiating evidence has since been found have been removed from the range map.
2.3.10 c) Reason for change - use of different method	The use of the standardised Range tool will also result in a change in the Range value, i.e. if the current Range tool was run on the 2007 distribution a different range value is likely to have been derived.
2.4.01 Surface area	96% of the total area was measured during site visits. The remaining 4% was estimated from site descriptions and photographs.
2.4.02 Year or period	PhD site visits took place from 2009 – 2012; field data for other reported locations were collected between 2007 and 2012.
2.4.03 Method used - Area covered by habitat	See 2.4.1.
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	The present survey constitutes the first field-based area measurement of this habitat and provides a baseline for future area measurements. There is no evidence of decline in the area of the habitat.
2.4.07 Short-term trend - Method used	The trend estimate is based on expert opinion since there are no field-validated baseline data with which to compare the present area.
2.4.12 a) Favourable reference area - In km2	The area figure derived by Lyons & Kelly (2013) is considered to represent the petrifying spring baseline. As there is no evidence of any significant decline in extent since the Directive came into force the current area is set as the FRA.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The previous assessment of area was calculated from a desk based study and was not field validated. The present area is derived from field measurements (See section 2.4.1).
2.5.01 Method used - pressures	Pressures were recorded during surveys of 102 sites as minor, moderate or severe. The estimated overall impact of each pressure on the conservation status of the habitat as a whole was used to rank pressures as being of high, medium or low importance. See Lyons & Kelly (2013) for further details.
2.6.01 Method used - Threats	There is no evidence to suggest the decline of any of the listed pressures; therefore they also constitute threats. The category H02.02 (Groundwater pollution by leakages from waste disposal sites) is added as a threat since there is a particular concern at one important site (see Lyons & Kelly, 2013).
2.7 Complementary information	Relevé data were collected across the range of petrifying springs (114 samples) and assigned to three main Subtypes: Woodland petrifying springs; Petrifying springs in open, inland habitats; Coastal petrifying springs (Lyons & Kelly, 2013). Typical species are ecological specialists which occur frequently across the range of subtypes.
2.7.02 Typical species - method used	See assessment form.

Field label	Note
Habitat code: 7220	
2.7.04 Structure and functions - Methods used	Sites were assessed for species composition, tufa formation and signs of damage. 34% of sites (accounting for 67% of total area) were classified as A1 (best examples; 'Favourable' structures and functions). 53% of sites were classified as A2, 8% as B and 5% as C ('Bad' structures and functions) (Lyons & Kelly 2013). Class C sites constitute a small proportion (1.4%) of the total area. Therefore the overall assessment of Structure and Functions is 'Unfavourable Inadequate'.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for petrifying springs is concentrated in the midwest to northwest of Ireland (Counties Clare to Sligo) and in the east midlands from the Dublin coast, extending into Co. Kildare and the Slieve Bloom Mountains. An absence of the habitat from the extreme south and north of the country corresponds with a lack of limestone bedrock, although petrifying springs sometimes occur where lime-rich glacial till overlies non-calcareous rocks. The range is assessed as 'Favourable'.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Petrifying springs are small, local features and hence the overall area of the habitat is small but assessed as 'Favourable'. A few very large sites (spring and fen complexes) contribute most of the area. Clarification of how to calculate the area of such sites could lead to a reduction in the stated area of the habitat.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structure and Functions are generally 'Favourable' across the range (67.2% of area). Minor threats affect 26.1% of area, moderate threats affect 5.3% and the remaining 1.4% of the habitat is in poor condition.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Structures and Functions were assessed in 2007 as 'unknown but likely to be Unfavourable Bad' based on a desk survey. Subsequent site surveys allowed a detailed analysis of structures and functions to be made. Different methods and a significant improvement in knowledge of the habitat mean that the findings of the present study are not comparable with the previous one. There is no evidence to suggest that the percentage in poor condition has changed to any great extent over the recent past or will deteriorate further into the near future; the trend for structures & functions is therefore assessed as 'Stable'.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Petrifying springs are vulnerable to a range of threats and pressures, especially alterations in water quality or flow and intensification of landuse practices. However, their often inaccessible location mitigates, to some extent, against these impacts. Some threats and pressures, such as abandonment of agricultural land, lead to gradual changes in habitat quality. Others, such as land drainage, cause catastrophic degradation or loss of habitat. Future prospects have been assessed as 'Unfavourable Inadequate' in recognition of the occurrence of these impacts over a small proportion of the total habitat area.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The future prospects qualifier is assigned as stable as there are no measures in place to reduce the current pressures but the situation is unlikely to get any worse.

Field label	Note
Habitat code: 7220	
2.8.05 Overall assessment of Conservation Status	A countrywide survey of petrifying springs (Lyons & Kelly, 2013) provides field-validated data on the range and area of petrifying springs in Ireland. As there is no evidence of decline, Range and Area are assessed as 'Favourable'. Plant species composition, environmental variables and threats and pressures were investigated across a wide range of sites (76% of the total area). Structure and Functions were assessed as 'Unfavourable Inadequate' as a small proportion of sites (6.7% of the area assessed) had been damaged by drainage or other inappropriate forms of management. Future prospects are assessed as 'Unfavourable Inadequate' in view of agriculture-related pressures of land reclamation, unsuitable grazing levels, pollution and water abstraction as well as more isolated instances of road drainage and outdoor leisure pursuits pressures. Education of landowners was identified as a means of promoting conservation of the habitat. Differences between the present assessment and the 2007 submission are due to improved knowledge of the habitat rather than a real change in its conservation status.
2.8.06 Overall trend in Conservation Status	The overall assessment trend is considered to be stable
3.1.02 Method used	The area within the SAC network was estimated. Please note this is the total area within the network whether or not the habitat is listed as a qualifying feature.
3.1.03 Trend of surface area within the network	The trend in assessed as stable in line with the national trend.
3.2 Conservation measures	Petrifying springs listed as qualifying interests in SACs are protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Drainage of large sites is controlled by EIA agricultural regulations (S.I. No. 456/2011 — European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011.). Petrifying springs are considerably smaller than the threshold value of 15ha but often the wetland systems associated with petrifying springs are large enough to bring the wetlands as a whole above the threshold.

Petrifying Springs (7220)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
03-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 7230	
NAME: Alkaline fens	

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2004-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

ANON 2010. County Meath Wetlands and Coastal Habitat Survey. A Report prepared for Meath County Council and the Heritage Council.

ATKINS. 2008. Mayo Habitats Survey. A Report by Atkins for Mayo County Council.

BARRON, S. J. & PERRIN, P. M. 2010. Review and amendment of GIS mapping for blanket bog NHAs. A report submitted to the National Parks and Wildlife Service.

CONAGHAN, J. & FULLER, J. 2004. An ecological survey of habitat cover in the Shannon/Newmarkey-on-Fergus region of South Co. Clare. Unpublished report and GIS commissioned by Clare County Council.

CRUSHELL, P. & FOSS, P. 2008. The County Clare Wetlands Survey: Desk Study and GIS Preparation. A Report prepared for Clare County Council, Ireland.

CRUSHELL, P., FOSS, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Kildare Wetland Survey. Part I: Main Report. Report prepared for Kildare County Council and The Heritage Council.

FOSS, P. 2007. Alkaline fens (7230) conservation status assessment. Unpublished report to the National Parks and Wildlife Service. Http://www.npws.ie/publications/euconservationstatus_NPWS_2007_Cons_Ass_Backing_V3.pdf

FOSS, P. J. & CRUSHELL, P. 2012. Wetland Survey County Monaghan II. Report prepared for Monaghan County Council and The Heritage Council.

FOSS, P., CRUSHELL, P., O'LOUGHLIN, B. & WILSON, F. 2012. County Louth Wetland Survey II. Part 1: Main Report. Report prepared for Louth County Council and The Heritage Council.

HICKEY, B. & TUBRIDY, M. 2009. County Laois Habitats Survey (Phase V). A Report prepared for the Laois Heritage Forum.

HURLEY, C. 2003. Habitat mapping, evaluation of semi-natural grassland and marsh and conservation recommendations for the north-west region of Ennis and environs. Unpublished MSc Thesis, Ecosystem Conservation and Landscape Management, NUI Galway.

KEARNEY, P. 2008. Survey and mapping of habitats from Cratloe to Parteen, South East Clare. A Report by RPS for Clare County Council and The Heritage Council.

KEARNEY, P. 2010. Habitat Mapping of Habitats in County Cavan. Survey Findings Report. A Report by RPS for Cavan County Council and The Heritage Council.

KILROY, G., DUNNE, F., RYAN, J., O`CONNOR, A., DALY, D., CRAIG, M., COXON, C., JOHNSTON, P. & MOE, H. 2008. A framework for the assesment of groundwater dependent terrestrial ecosystems under the water framework directive (2005-W-

FS-5). Associated datasets and digital information objects connected to this resource are available at Secure Archive For Environmental Research Data (SAFER) managed by the Environmental Protection Agency Ireland. Http://erc.epa.ie/safer/resource?id=b5799c70-224b-102c-b381-901ddd016b14.
KIMBERLEY, S. 2013. Conservation status assessment for three fen habitat types. Unpublished report to the National Parks and Wildlife Service.
MERC. 2007. Audit of Biological Datasets for Counties Cavan and Roscommon as cited in Kearney (2010).
NATURA 2005. Galway City Habitat Inventory. A Report prepared by NATURA Environmental Consultants on behalf of Galway City Development Board.
NATURA 2007. Westmeath Fen Study. Draft Final Report prepared for Westmeath County Council and The Heritage Council by NATURA Environmental Consultants.
PERRIN, P.M., BARRON, S.J., ROCHE, J.R. And O`HANRAHAN, B. 2010. Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 1.0. Irish Wildlife Manuals, No. 48. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Data extracted from Phase 3 of the National Survey of Upland Habitats.
TUBRIDY, M. 2006. Heritage Surveys of Vulnerable Landscape. A Report for Clare County Council.
WHITE YOUNG GREEN 2008. Galway Wetlands Scoping Study. Final Report prepared for Galway City Council by White Young Green, Dublin.
WILSON, F. & FOSS, P. J. 2011. The County Wicklow Wetland Survey. Report prepared for Wicklow County Council and The Heritage Council.
WILSON, F. 2009. County Sligo Wetland Survey. A Report prepared for Sligo County Council and The Heritage Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	32900	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	32900
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range as there is no evidence of a decline since the Directive came into force. The FRR is considered to encompass all ecological and geographical variation of the habitat.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	130.2		
2.4.2 Year or period	2004-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	more than (>)	
	unknown	No	
	method	Although losses of habitat area are considered to have occurred since the Directive came into force the magnitude of the decline is unknown. The FRA is set as > than the current area. It is unlikely that >10% of the resource has been lost since 1994. An additional 1-10% of the current area is considered adequate to ensure the long-term viability of the habitat.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Peat extraction (C01.03)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A

disposal of inert materials (E03.03)	low importance (L)	N/A

2.5.1 Method used – pressures: based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	high importance (H)	N/A
diffuse groundwater pollution due to agricultural and forestry activities (H02.06)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
Peat extraction (C01.03)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A
Restructuring agricultural land holding (A10)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
disposal of inert materials (E03.03)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Anagallis tenella

Aneura pinguis

Blindia acuta

Bryum pseudotriquetrum

Calliergonella cuspidata

Campylium stellatum

Carex dioica

Carex echinata

Carex hostiana

Carex nigra

Carex panicea
Carex pulicaris
Carex viridula ssp. Brachyrrhyncha
Carex viridula ssp. Oedocarpa
Cirsium dissectum
Ctenidium molluscum
Dactylorhiza incarnata
Dactylorhiza traunsteineri
Drepanocladus cossonii
Drepanocladus revolvens
Eleocharis multicaulis
Eleocharis quinqueflora
Epipactis palustris
Eriophorum latifolium
Fissidens adianthoides
Galium palustre
Hydrocotyle vulgaris
Juncus articulatus
Juncus bulbosus
Juncus subnodulosus
Mentha aquatica
Molinia caerulea
Palustriella commutata
Parnassia palustris
Pinguicula vulgaris
Schoenus nigricans
Scorpidium scorpioides
Selaginella selaginoides
Succisa pratensis

2.7.2 Species method used	The current list of typical species is based almost exclusively on the previous conservation assessment report for the habitat (Foss, 2007). This list was derived using a number of publications on Irish fen vegetation (O'Criodain and Doyle 1994, 1997, Doyle and O'Criodain 2003, White and Doyle 1982 and Foss 2007). Blindia acuta was added to the list based on information reported by the National Survey of Upland Habitats (NSUH) (Perrin et al., 2010). The NSUH has devised a refined vegetation classification, based on standard vegetation classification schemes (White and Doyle 1982, Rodwell, 1991, 1992), relevé datasets and expert judgement, in order to adequately record alkaline fen (7230) habitats. The vegetation classification scheme identified two Irish habitat sub-types that corresponded with 7230, namely RFLU1a and RFLU2. RFLU1a is described as relatively species-rich flush with typically abundant Carex viridula ssp. brachyrrhyncha or oedocarpa and brown mosses. RFLU2 is distinguished by

	RFLU1a by conspicuous amounts of Eleocharis quinqueflora. All species noted as indicative of RFLU1a and RFLU2 were on the previous list of typical species, with the exception of Blindia acuta. Targets for cover and abundance of species from the vegetation communities from the National Survey of Uplands Habitats were derived to assess the quality of Habitats at monitoring stops.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on expert opinion with no or minimal sampling (1)
2.7.5 Other relevant information	33.11 km2 of the habitat is listed as a Qualifying Interest within the SAC network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	unknown (x)
2.8.4 Future prospects	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	unknown (x)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	63.49	max	63.49
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Other wetland-related measures (4.0)	Administrative	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal	high importance (H)	Both	Enhance
Managing water abstraction (4.3)	Legal	high importance (H)	Both	Enhance
Measures needed, but not implemented (1.2)		high importance (H)	Both	

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 7230	
0.1 Member State	Ireland
0.2 Habitat code	Alkaline fens are typically base-rich basin or flush fen systems with extensive areas of species-rich small sedge communities of the alliance Caricion davallianae. These fen systems are often a complex mosaic of habitats, with tall sedge beds, reedbeds, wet grasslands, springs and open-water often co-occurring at a given fen site. Alkaline fen habitat can occur beyond peat-forming fen systems, such as in dune slacks and wet grasslands. Based on a phytosociological description of small-sedge vegetation in Ireland, the associations Campylio-Caricetum dioicae, Schoenetum nigicantis and Juncetum subnodulosi correspond with 7230 Alkaline fens. The most extensive areas of alkaline fens in Ireland are thought to occur in lowland basins associated with limestone groundwater bodies with a karstic or poorly productive flow regime. Alkaline fens within flushes in upland and lowland regions, along the fringes of calcareous lakes and within turloughs, dune slacks and machair are thought to be more limited in extent but more widespread.
1.1.02 Method used - map	A baseline, national field survey of fen habitats had not been conducted in Ireland to date. The habitat distribution was based to a large extent on the NPWS Fen Study Database compiled as part of the 'Study of the extent and conservation status of springs, fens and flushes in Ireland' (Foss, 2007). Additional sites were extracted from a variety of relatively recent field and desk-based surveys (Conaghan & Fuller 2004, Natura 2005, Tubridy, 2006, Natura 2007, MERC 2007, Kearney 2008, Atkins 2008, Kilroy et al. 2008, Crushell & Foss 2008, Hickey & Tubridy 2009, Wilson 2009, Perrin et al. 2010, Kearney 2010, ANON 2010, Wilson & Foss 2011, Foss & Crushell 2012, Foss et al. 2012 and Crushell et al. 2012).
1.1.03 Year or period	Numerous desk-based and field fen surveys have been conducted between 2004 and 2012; please note that data collated as part of the desk studies may have come from sources older than the publication date.
1.1.04 Additional distribution map	Alkaline fen locations as per Section 1.1.2 were intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	A range map was derived following the standardised methods using the Article 17 Range tool.
2 Biogeographical level	ATL
2.2 Published sources	Kimberley (2013) summarises current knowledge on this habitat. The previous conservation status assessment (Foss, 2008) was based on results generated from a desk study of the national extent of springs, fens and flushes. Numerous desk-based and field fen surveys have been conducted in recent years. Two desk studies have improved the geospatial information for fens occurring within blanket bogs (Barron and Perrin, 2011) and within SAC complexes (Kilroy et al. 2008). Recent field surveys as part of the National Survey of Upland Habitats have mapped fen habitats across SAC areas within 5 counties (Perrin et al., 2010). County wetland/habitat surveys of varying detail have been conducted within 11 counties (Hurley 2003, Conaghan & Fuller 2004, Natura 2005, Tubridy 2006, MERC 2007, Natura 2007, Atkins 2008, WYG 2008, Crushell & Foss 2008, Kearney 2008, Hickey & Tubridy 2009, Wilson 2009, Anon 2010, Kearney 2010, Wilson & Foss 2011, Crushell et al. 2012, Foss & Crushell 2012).
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.

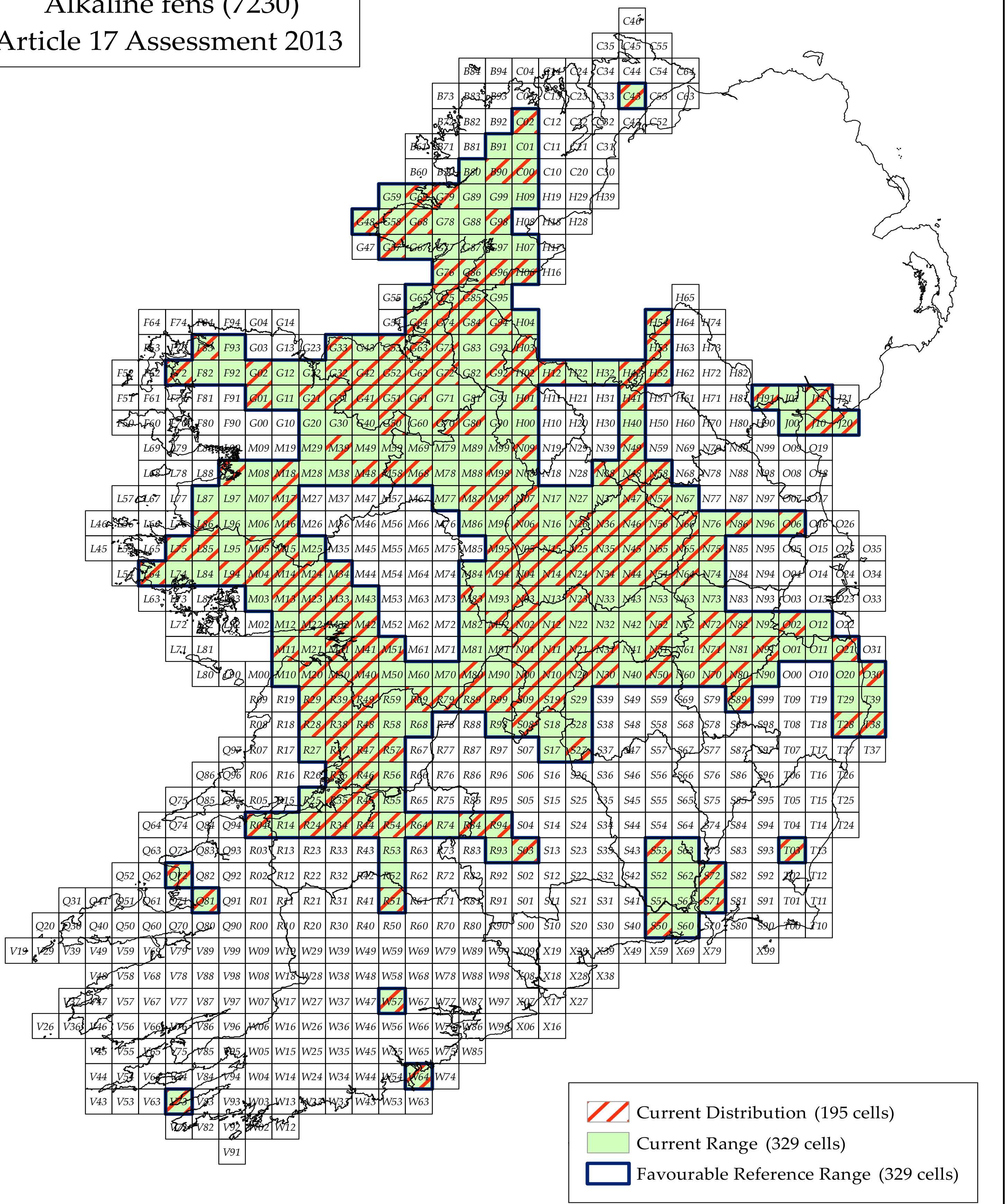
Field label	Note
Habitat code: 7230	
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The range trend was assessed as stable. There is no evidence to suggest that there has been a significant decline in the habitat distribution over the past 12 years. In the absence of a national field survey of fens, the current distribution and range maps provide a more refined estimate of the national habitat extent; however they may significantly underestimate the national resource.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.
2.3.10 c) Reason for change - use of different method	Discrepancies between the previous and current distribution and range are mainly attributed to differences in the mapping protocols. The previous habitat distribution map was generated by intersecting the entire SAC boundary with the 10km grid in cases where points in the NPWS Fen Survey Database occurred within non-extensive designated areas with a digitised site boundary. This process overestimated the extent of habitat in these cases. The NPWS Fen Study Database shapefile contained sites known to contain alkaline fen and sites thought to possibly contain alkaline fen. The latter sites were excluded from the current distribution owing to the high degree of uncertainty associated with the data.
2.4.01 Surface area	The extent of alkaline fens within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat.
2.4.02 Year or period	The area figures were derived for the data surveyed and collated between 2004 and 2012. Some of the surveys may have been undertaken before the period specified.
2.4.03 Method used - Area covered by habitat	See 2.4.1
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	The trend in area is considered to be declining. This is due to landfill and land reclamation being noted as an ongoing pressure on c5% of sites referred to in Kimberley (2013).
2.4.07 Short-term trend - Method used	The trend estimate is based on expert opinion of the data sources available since there are no field-validated baseline data with which to compare the present area.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	There has been an improvement of knowledge as a result of the desk-studies and field surveys undertaken during the reporting period See Section 2.2 for more details.
2.4.13 c) Reason for change - use of different method	There are two main reasons why the current maximum surface area estimate is significantly greater than the previous estimate given the reduced habitat distribution. Firstly, estimates of the area of Alkaline fen habitat were outstanding for many sites in the NPWS Fen Survey Database at the time of the previous conservation assessment and the estimated surface area (68.4km2) was regarded as a minimum in the absence of a detailed field survey of fens. Secondly, the current conservation assessment assigned an estimated area to sites recorded in the NPWS Fen Survey Database, included in the habitat distribution and lacking an area estimate. The estimated area was the median area of those sites (112500 m2 or 11.25 ha) in the NPWS Fen Survey Database with an estimated habitat area and also included in the current habitat distribution.

Field label	Note
Habitat code: 7230	
2.5 Main pressures	The ranked list of pressures was based on site-specific pressures recorded during six county wetland surveys (Atkins 2008, Wilson 2009, Wilson and Foss 2011, Foss and Crushell 2012, Crushell et al. 2012); general assessments of pressures impacting on the habitat as a whole (Natura 2005, Natura 2006, Natura 2007, WYG 2008, Crushell & Foss 2008); pressure summaries provided by NPWS for SACs where 7230 Alkaline fens are a Qualifying Interest and expert judgement. See Kimberley (2013) for further details. Pressures noted prior to the reporting period were included due to the lack of national data on this habitat; they are considered to represent ongoing pressures.
2.6 Main threats	There is no evidence to suggest the decline of any of the listed pressures; therefore they also constitute threats. M01 (Changes in abiotic conditions) is added as a threat as changes in precipitation patterns and frequency driven by climate change will likely lead to alterations to the hydrological regimes of fen habitats.
2.7.04 Structure and functions - Methods used	The key structures and functions of alkaline fens are a stable, high water table, a calcareous, low nutrient water supply and controlled mowing and/or grazing (Sefferova Stanova et al., 2008). There is currently no consistent, broad-scale assessment or monitoring of alkaline fen structures and functions in Ireland, however indicators of fen structures and functions are under development based on an improved understanding of Irish fen ecological requirements and of ecological responses to pressures. The structures and functions of a subset of alkaline fen (7230) sites were assessed as part of the National Survey of Upland Habitats (Perrin et al. 2010). Sites were assessed for vegetation composition and structure and physical structures, including signs of damage. 36% of the sub-set of alkaline fen (7230) sites failed the conservation assessment. As groundwater-dependent wetlands, there have been significant attempts during the reporting period to assess the influence of groundwater related pressures on the ecological condition of alkaline fen sites within the SAC network (Kilroy et al. 2008, Curtis et al. 2009, Kimberley & Coxon 2013, Kimberley 2013). A recent field survey of lowland alkaline fen sites used vegetation-based positive and negative nutrient indicators to identify sites where there is evidence of a nutrient impact that may be related to groundwater nutrient inputs. 65% of surveyed alkaline fens were found to be in poor ecological condition. Disparate county wetland surveys provide valuable site-specific information on vegetation composition, pressures and ecological value however overall assessments of site structures and functions and ecological condition are lacking. Assessments of damage are therefore used here as a proxy for assessments of site ecological condition. The most comprehensive, recent county-level field surveys of fens (Wilson 2009, Wilson & Foss 2011, Foss et al. 2012, Foss & Crushell 2012, Crushell et al. 2012) report that a majority of fen habitat types are damaged from human activities. Based on the limited evidence presented above, it can be stated with a moderate level of confidence that a significant majority of both upland and lowland alkaline fens (7230) have impaired structures and functions and that the structures and functions of more than 25% of the national resource is impaired.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range is assessed as ‘Favourable’ as there is no evidence of a significant decline in the range since the Directive came into force.

Field label	Note
Habitat code: 7230	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Alkaline fen sites may occur as small patches or as large extensive complexes. The extent of alkaline fens within many counties remains unmapped and therefore the surface area of the habitat is mainly based on estimated site areas. A national fen survey could lead to a reduction or increase in the stated area of the habitat. There is evidence of ongoing losses in Area since the Directive came into force, however these losses are unlikely to be at a rate greater than 1% per annum or more than 10% below the FRA, therefore Area is assessed as Unfavourable –inadequate.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	As losses are considered to be ongoing the qualifier is set as declining, however Regulations referred to in 3.2 should halt this trend.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Structures and functions were assessed in 2007 as 'unknown but likely to be Unfavourable bad' owing to a lack of satisfactory data on habitat quality, habitat change or species trends. Structures and functions are again assessed as Unfavourable-Bad based on limited evidence that indicates that a significant proportion (>25%) of the national resource has impaired structures and functions. A national baseline fen survey has not been conducted to date in Ireland and disparate county level surveys are the main source of new information on alkaline fens. These surveys however use different habitat classification and mapping methods and there is still a lack of comparable data on the structures and functions of the habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The trend for structures & functions is assessed as unknown in the absence of a baseline survey of alkaline fens since the last reporting period.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Alkaline fens are particularly vulnerable to land drainage and water abstractions within the immediate locality and wider catchment areas. Land abandonment can also lead to loss of species-rich small sedge communities. Lowland fens are expected to remain under relatively greater pressure from agricultural intensification than upland fens. Future prospects have been assessed as 'Unfavourable Bad given that a significant proportion (> 25%) of the habitat is damaged (cf Section 2.7.4) coupled with the fact that there are no restoration measures in place.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The trend for future prospects is considered to be improving due to additional protection afforded under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011 and the Groundwater Regulations 2010 (see 3.2 for further detail).

Field label	Note
Habitat code: 7230	
2.8.05 Overall assessment of Conservation Status	Range is assessed as Favourable as there is no evidence of a decline since the Directive came into force. Ongoing losses of habitat Area resulted an Unfavourable- inadequate declining assessment. Structure and Functions and Future Prospects were assessed as Unfavourable-Bad based on limited evidence that indicates that a significant majority (>25%) of the national resource has impaired structures and functions. The Future Prospects for the habitat have however improved since previous conservation assessment due to recently implemented regulations that afford wetlands a higher level of protection. Conservation of alkaline fens in Ireland is compromised by the lack of a definitive vegetation classification or formal description of the habitat as it occurs in Ireland and of accurate geospatial data. A baseline fen survey is lacking and disparate county level surveys use contrasting habitat classification and mapping methods which compromise the comparability of the information. The 2007 conservation assessment cited a lack of reliable, comparable data as a major hindrance for accurately assessing the conservation status of the habitat as a whole and this remains the case. The overall habitat conservation status has been assessed as Unfavourable-Bad due to impaired Structure and Functions.
2.8.06 Overall trend in Conservation Status	The overall assessment trend is considered to be unknown owing to a lack of knowledge on the trends in condition.
3.1.03 Trend of surface area within the network	The trend is assessed as stable as there is unlikely to have been significant loss of this habitat within the SAC network.
3.2 Conservation measures	The 2011 Habitat Regulations protect alkaline fens listed as qualifying interests in SACs by regulating any plans or projects than may impact negatively on the habitat. In addition, NPWS have compiled a list of Activities Requiring Consent (ARCs) that are only granted if they do not exert a negative impact on Qualifying Features within an SAC. The 2010 Groundwater Regulations implement the Groundwater Directive (2006/118/EC) in Ireland. Alkaline fens are one of the habitat types on the EU WFD Register of Protected Areas (Annex I habitat types under the EU Habitats Directive) identified by NPWS as one of eleven priority groundwater dependent terrestrial ecosystems (GWDTEs). Priority GWDTE types are those that are most dependent on groundwater and priority sites are within the Natura 2000 network. The WFD requires Member States to prevent and remedy groundwater related damage (both quantitative and chemical) to groundwater dependent wetlands. Drainage or reclamation of wetlands (which includes fens) is controlled under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011. Permission is required from the relevant Local Authority where the area impacted by the works exceeds 0.1ha or the works may have a significant effect on the environment. Areas greater than 2ha require an EIS with the planning application. Works include installation of open drains or closed drains, opening of a watercourse, infilling with earth etc. The lack of conservation measures pertaining to active within site management at alkaline fen sites presents a significant threat to the long-term viability of the habitat. Mowing and/or controlled light grazing is necessary to prevent encroachment of grass and/or tussock forming sedges and to maintain species-rich small sedge communities in fens.

Alkaline fens (7230)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
10-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8110

NAME: Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks & 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 & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Derwin, J. (2004) Survey and evaluation of blanket bogs for proposal as Natural Heritage Areas. Unpublished report prepared for the National Parks and Wildlife Service.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Hodd, R.L. (2012) A study of the ecology of the oceanic montane vegetation of western Ireland and its potential response to climate change. Unpublished PhD thesis, NUI Galway, Ireland.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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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., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. 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. 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. (2013c). 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. (2013d). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013e). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.

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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. (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.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2011a) 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.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2011b) National Survey of Upland Habitats (Phase 1, 2010 - 2012), Site Report No. 5: Nephin Mountain Co. Mayo. 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. (2012a) 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.

Roche, J.R., Perrin, P.M., Barron, S.J. & Daly, O.H. (2012b) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 8: Killarney National Park, Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Wyse Jackson, P.S. (2008) The potential impact of climate change on native plant diversity in Ireland. Online at: http://www.botanicgardens.ie/news/20080122.htm. Date accessed: 25 April 2013.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	14800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	14800
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	20.33
2.4.2 Year or period	2007-2012
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.4 Short-term trend period	2001-2012
2.4.5 Short-term trend direction	stable (0)
2.4.6 Short-term trend magnitude	min max confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)
2.4.8 Long-term trend period	
2.4.9 Long-term trend direction	N/A
2.4.10 Long-term trend magnitude	min max confidence interval
2.4.11 Long term trend method used	N/A
2.4.12 Favourable reference area	area (km)
	operator: approximately equal to (≈)
	unknown: No
	method: 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. Whilst 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.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
mountaineering & rock climbing (G01.04.01)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
Erosion (K01.01)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
mountaineering, rock climbing, speleology (G01.04)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A

Erosion (K01.01)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats	modelling (2)

2.7 Complementary Information

2.7.1 Species

- Asplenium adiantum-nigrum
- Athyrium filix-femina
- Blechnum spicant
- Dryopteris spp. (counted separately)
- Hymenophyllum tunbridgense
- Hymenophyllum wilsonii
- Saxifraga spathularis
- Sedum rosea

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each block scree monitoring stop at least one typical species were required to be present. As this was a baseline survey, trends for the assemblage and for individual species were not assessed. Typical species were not assessed for small clast size scree.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network = 18.90 km2 Area of habitat outside SAC network = 1.43 km2 Area of habitat within SAC network that is QI = 2.31 km2 Area of habitat within SAC network that is not QI = 16.58 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		improving (+)

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	18.9	max	18.9
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Administrative	medium importance (M)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 8110	
0.2 Habitat code	Habitat 8110 has been defined in an Irish context by Perrin et al. (2013a). Siliceous scree consists of accumulations of siliceous rock fragments on slopes below upland cliffs or on exposed / frost-shattered mountain summits or ridges. Rocks may vary in size from large blocks (also known as talus) that can be very stable down to smaller fragments that can be highly mobile. Areas of loose rock on summits or plateaux exposed by erosion of high altitude blanket bog and areas akin to fell-field are not included. Areas of scree which have vegetated to point that they can be classified as another habitat (e.g. dry heath or scrub) are also not included. Whilst there is no strict altitudinal threshold, this habitat is limited to examples of scree occurring in an upland landscape context. The vegetation may be very sparse and can comprise chiefly of bryophyte and lichen assemblages, but calcifuge ferns (e.g. Dryopteris dilatata, Hymenophyllum wilsonii or Saxifraga spathularis are typically present. The definition of this habitat has been revised since the 2000-2006 reporting period (NPWS 2007) in that whilst the presence of arctic-alpine species indicates high quality examples of this community, it is not deemed a requisite.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. The habitat is found in upland areas in the northwest, western Galway and Mayo, western Kerry and Cork, Wicklow, Waterford and southern Tipperary, and Louth.

Field label	Note
Habitat code: 8110	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat habitat 8110 or Fossitt code ER3 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). 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. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. 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 cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron & Perrin 2011). National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these. NPWS (2007) GIS shapefiles created during the previous assessment of habitats. Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available. Polygons were clipped to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. Where specific areas of rocky slope had been mapped, these polygons superseded those denoting NHA, pNHA or cSAC site boundaries. For designated sites listed by the Habitats Assignment Project (HAP) for habitat 8110 but for which no specific areas of scree had been mapped, the point shapefile was used to mark locations where this habitat may occur based on 2005 aerial photograph interpretation. For the last report (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 slope rather than 8110 Siliceous scree, but

Field label	Note
	it is logical to assume that there is a good chance of scree occurring in association with these areas. Habitat 8110 is not limited to locations defined by these parameters, which were guided at the time by the focus on arctic-alpine species. They do however give a nationwide estimate of where the better examples of this habitat may be found. Points representing the centroids of these polygons were therefore also added to the point shapefile. Arial photograph interpretation was use to add a limited number of points for the Inishowen and Fanad peninsulas in Donegal and Mount Leinster. Polygons from the CPU were used in preference to the draft Vegetation and habitat survey of Wicklow Uplands cSAC [O'Donovan G., (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service].
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at each of the fourteen sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b 2012a,b, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document, GIS shapefiles and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Hodd (2012) reports on modelling of the effects of climate change on arctic-alpine species in the uplands. Wyse Jackson (2008) is a consideration of the impacts of climate change on plant diversity in Ireland.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 8110 and include important site for this habitat such as Mount Brandon cSAC and Mweelrea / Sheeffry / Erriff Complex cSAC. The NSUH has so far concentrated mainly on the northwest of the country.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.

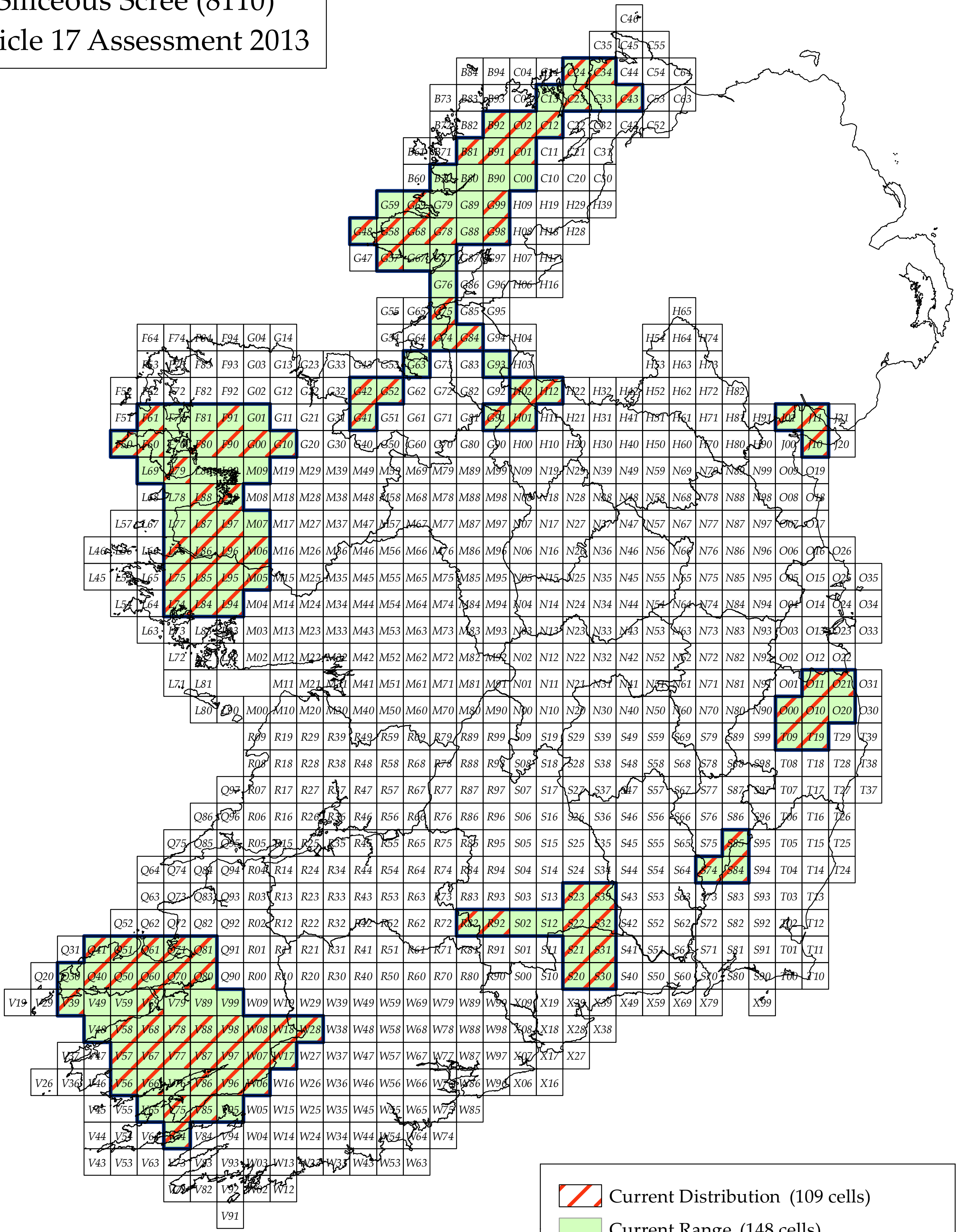
Field label	Note
Habitat code: 8110	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 10,900 km2. Some squares have been lost from the range due to the use of more localised records rather than using just designated site boundaries (e.g. Wicklow Mountain SAC). New squares have been included due to new records.
2.3.10 c) Reason for change - use of different method	The use of the range tool has had an effect as small gaps (less than 2 squares) were not included in 2007.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat; the mean percentage was 12%. For polygons from other sources that mapped specific areas of this habitat (e.g. CPU), habitat percentages were initially calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 8220 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. However this resulted in a mean percentage of 85% for polygons from non-NSUH sources which would led to an implausibly high estimate for total habitat area (37.5 km2). Instead, the 12% figure from NSUH data was used across the board as an estimate for non-NSUH sources. For each of the point records not intersecting within a polygon that was yielding an area, 400 m2 of habitat was estimated. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycle
2.4.05 Short-term trend - Trend direction	At the sample of sites covered by the NSUH there is no apparent loss of habitat since 2001, with possibly some minor increases due to erosion.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 1.5 km2. More accurate knowledge of the area of habitat 8110 is available from the NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	For the 2007 report, the area was calculated based on data from a Digital Terrain Model using polygons defined by criteria of north and north-east facing slopes, slope of more than 65 degrees and elevation above 350 m.

Field label	Note
Habitat code: 8110	
2.5 Main pressures	Sheep grazing is widespread at most of the sites surveyed by the NSUH but is deemed to be of medium importance for this habitat because of the often inaccessible nature of block scree or highly- mobile scree slopes. In terms of recreational activities, low levels of walking and bouldering are undertaken within this habitat. The non-native invasive species Campylopus introflexus and Acaena novae-zelandiae were recorded at low frequencies within this habitat. On stable block scree, bracken encroachment and succession towards 4030 Dry heath may occur. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at athe expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact (C. Douglas pers. comm.).
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. No information relevant to this habitat was recorded in the NPWS Site Inspection Report database. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of climate change. Climate change is predicted to impact on the occurrence of arctic-alpine plants in Ireland (Wyse Jackson, 2008). Some of these are found in high-quality examples of this habitat. As effects from climate change in the next 12 years are likely to be small, the threat is assessed as low, although in the longer term this could be a more significant threat.
2.6.01 Method used - Threats	Modelling of distributions of arctic-alpine plants in Irelands has been conducted by Hodd (2012).
2.7 Complementary information	The list of typical species applies to block scree only and is based on field observations during the NSUH.

Field label	Note
Habitat code: 8110	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete. A total of 48 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. The main failures were due to low cover of bryophytes and lichens, absence of indicator species in block scree, presence of non-native species and cover of grass and dwarf shrubs. 1. Cover of bryophyte species and non-crustose lichens ≥ 5 (16.7%) 2. Proportion of vegetation composed of negative indicator species <1% (0.0%) 3. Proportion of vegetation composed of non-native species <1% (6.3%) 4. No. of positive indicator species ≥ 5 (block scree only) (11.1%) 5. Cover of grass species and dwarf shrubs <20% (8.3%) 6. Cover of Pteridium aquilinum, native trees and scrub <25% (2.1%) 7. Browsing of dwarf shrubs and grazing of forbs <50% (4.5%) 8. Disturbed ground in relevé <10% (0.0%) 9. Disturbed ground in local vicinity <10% (0.0%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is approximately equal to the FRV for area although the FRV may change following future fieldwork. There is no indication of any significant current change.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 48 monitoring stops recorded in this habitat by the NSUH, 13 stops (27%) failed. This failure rate is over 25% and hence a U2 – Bad assessment is suggested. However, on review with NPWS staff it was decided that a U1 – Inadequate assessment was more appropriate due to small margin of the decision and the lack of any major single impact. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the impacts on this habitat is grazing, a qualifier of “+improving” is applied due to the Commonage Framework Plans (CFP). Note, however, that the CFP does not provide data specific to habitat 8110 and has had limited monitoring. The NSUH is a baseline survey and so has provides no data on trends. Note also that improvements due to lower grazing levels are may be tempered by other ongoing impacts, and if levels become too low heath and scrub invasion could become problems. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no fieldwork was actually conducted; there is no evidence that status has actually declined since this time.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Poor prospects, but none have Bad prospects future prospects is assessed as U1 – Inadequate. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / =FRV / =stable / =FRV / Good S&F / <FRV / +improving / <FRV / Poor

Field label	Note
Habitat code: 8110	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As one of the parameters is improving and none are declining, the qualifier is assessed as improving.
2.8.05 Overall assessment of Conservation Status	As one of the parameters is assessed as U1 – Inadequate and none are as U2 – Bad, the overall assessment is U1 - Inadequate
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.2 Conservation measures	The majority of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3).

Siliceous Scree (8110)
Article 17 Assessment 2013



Current Distribution (109 cells)

Current Range (148 cells)

Favourable Reference Range (148 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8120

NAME: Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Derwin, J. (2004) Survey and evaluation of blanket bogs for proposal as Natural Heritage Areas. Unpublished report prepared for the National Parks and Wildlife Service.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Hodd, R.L. (2012) A study of the ecology of the oceanic montane vegetation of western Ireland and its potential response to climate change. Unpublished PhD thesis, NUI Galway, Ireland.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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. (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.

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), Draft 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. (2013d). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 14: Slieve League cSAC (000189), Co. Donegal. 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.

Wyse Jackson, P.S. (2008) The potential impact of climate change on native plant diversity in Ireland. Online at: http://www.botanicg ardens.ie/news/20080122.htm Date accessed: 25 April 2013.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	2400	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	2400
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	0.84		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	
	operator	approximately equal to (≈)
	unknown	No
	method	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. Whilst 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.

2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	high importance (H)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
walking, horseriding and non-motorised vehicles (G01.02)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats	modelling (2)

2.7 Complementary Information

2.7.1 Species

Asplenium adiantum-nigrum

Asplenium ruta-muraria

Asplenium trichomanes

Asplenium viride

Carex pulicaris

Ceterach officinarum

Cystopteris fragilis

Dryas octopetala

Geranium lucidum

Geranium robertianum

Hieracium spp. (counted as one)

Koeleria macrantha

Oxalis acetosella

Phegopteris connectilis

Polystichum aculeatum

Polystichum lonchitis

Polystichum setiferum

Saxifraga aizoides

Saxifraga oppositifolia

Silene acaulis

Teucrium scorodonia

Thalictrum alpinum

Tortella tortuosa

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop at least three typical species were required to be present, with at least one of the species being a fern or saxifrage. As this was a baseline survey, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network = 0.70 km2 Area of habitat outside SAC network = 0.14 km2 Area of habitat within SAC network that is QI = 0.69 km2 Area of habitat within SAC network that is not QI = 0.01 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A

2.8.2 Area	assessment Favourable (FV) qualifiers N/A
2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.7	max	0.7
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	medium importance (M)	Both	Enhance
Maintaining grasslands and other open habitats (2.1)	Administrative	medium importance (M)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 8120	
0.2 Habitat code	Habitat 8120 has been defined in an Irish context by Perrin et al. (2013a). It consists of accumulations of calcareous rock fragments on slopes below upland cliffs or on exposed / frost-shattered mountain summits or ridges. Rocks may vary in size from large blocks (also known as talus) that can be very stable down to smaller fragments that can be highly mobile. Areas of loose rock on summits or plateaux exposed by erosion of high altitude blanket bog and areas akin to fell-field are not included. Areas of scree which have vegetated to point that they can be classified as another habitat (e.g. dry heath or scrub) are also not included. Whilst there is no strict altitudinal threshold, this habitat is limited to examples of scree occurring in an upland landscape context. The vegetation may be very sparse and can comprise chiefly of bryophyte and lichen assemblages, but calcicole ferns (e.g. Asplenium viride, Cystopteris fragilis) or Saxifraga species are typically present. The definition of this habitat has been revised since the 2000-2006 reporting period (NPWS 2007) in that whilst the presence of arctic-alpine species indicates high quality examples of this community, it is not deemed a requisite.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. The core area of this habitat is the Dartry Mountains in Sligo and Leitrim and the Bricklieve Mountains/Keshcorran in southern Sligo, where it occurs in the context of calcareous uplands. Outlying locations in Donegal, Mayo, Galway and Kerry represent small and possibly marginal examples of the habitat largely in the context of metamorphosed siliceous rocks or base-rich conglomerate. Due to the incomplete nature of the National Survey of Upland Habitats (NSUH) it is highly likely that other outlying locations for this habitat remain to be located.

Field label	Note
Habitat code: 8120	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat habitat 8120, Fossitt code ER4 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura 2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. Habitat Assignment Project. An NPWS spreadsheet noting the qualifying interest of SACs and other habitats which occur in SACs, NHAs and cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these. NPWS (2007) GIS shapefiles created during the previous assessment of habitats. Flora of Connemara and the Burren (Webb & Scannell 1983). A point record was added where Saxifraga oppositifolia and Asplenium viride were recorded on talus. Emma Glanville NPWS. Point records of scree in the Burren provided by local NPWS ranger. Polygons were clipped to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. Where specific areas of rocky habitat had been mapped, these polygons superseded those denoting NHA, pNHA or cSAC site boundaries. For the one designated site listed by the HAP for habitat 8120 but for which no specific areas of scree had been mapped, Maumtrasna Complex pNHA, the point shapefile was used to mark locations within the site where this habitat may occur based on information in the site synopsis and through examination of the
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.

Field label	Note
Habitat code: 8120	
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/ Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at five of the fourteen sites surveyed (Perrin et al. 2011, 2012, 2013b, c, d). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Hodd (2012) reports on modelling of the effects of climate change on arctic-alpine species in the uplands. Webb & Scannell (1983) mentions locations of indicator species in Connemara. Wyse Jackson (2008) is a consideration of the impacts of climate change on plant diversity in Ireland.
2.3.02 Method used - Range	Accurate mapping for this habitat has been conducted by the NSUH for two of its main sites, Ben Bulben, Gleniff and Glenade Complex cSAC and Arroo Mountain cSAC, but only partial data exists for other sites in Sligo and Leitrim. As noted above, due to the incomplete nature of the National Survey of Upland Habitats (NSUH) it is highly likely that other outlying locations for this habitat remain to be located.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Range in NPWS (2007) was 1,000 km2. The loss of one square from the range in southern Sligo is due to the use of CPU habitat data rather than using just the SAC site boundary. The overall increase in range is due to the recording of small outlying sites by the NSUH and the inclusion of sites in the Burren. There is no evidence of any real change in range for this habitat.
2.3.10 c) Reason for change - use of different method	The use of the range tool has brought in additional squares in the Dartry Mountains and west Galway.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.

Field label	Note
Habitat code: 8120	
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat; the mean percentage was 14%. For polygons from other sources that mapped specific areas of this habitat, habitat percentages were initially calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 8120 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. However this resulted in a mean percentage of 79.9% for polygons from non-NSUH sources which would led to an implausibly high estimate for total habitat area (2.1km2). Instead, the 14% figure from NSUH data was used across the board as an estimate for non-NSUH sources. For each of the point records 400 m2 of habitat was estimated. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	At the sample of sites covered by the NSUH there is no significiant loss of habitat since 2001. On Ben Bulben, minor possible losses due to quarrying and paths are likely to have been compensated by landslides and cliff collapses.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 0.05 km2. More accurate knowledge of the area of habitat 8120 is available from the NSUH for selected sites. Also additional areas in the Burren have been included.
2.4.13 c) Reason for change - use of different method	For the 2007 report, the area was calculated based on data from a Digital Terrain Model using polygons defined by criteria of north and north-east facing slopes, slope of more than 65 degrees and elevation above 350 m on calcareous geology for Sligo and Leitrim. A small additional area was added for the Bricklieve Mountains.
2.5 Main pressures	Sheep grazing occurs at all of the sites surveyed by the NSUH. Whilst grazing impacts on the existing vegetation were generally assessed as low, sheep tracks across scree slopes with associated erosion were noted and Urtica dioica was frequent in some areas. Chronic levels of unsuitable grazing pressure may have removed indicator species from some areas. Small areas of scree were noted as having been affected by quarrying and the construction of paths. Although it does not currently occur at abundances at which it would be likely to be outcompeting native species, Epilobium brunnescens was recorded very frequently within this habitat and is likely to spreading. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources. Nitrogen enrichment from years of high sheep densities would also have an impact (C. Douglas pers. comm.).

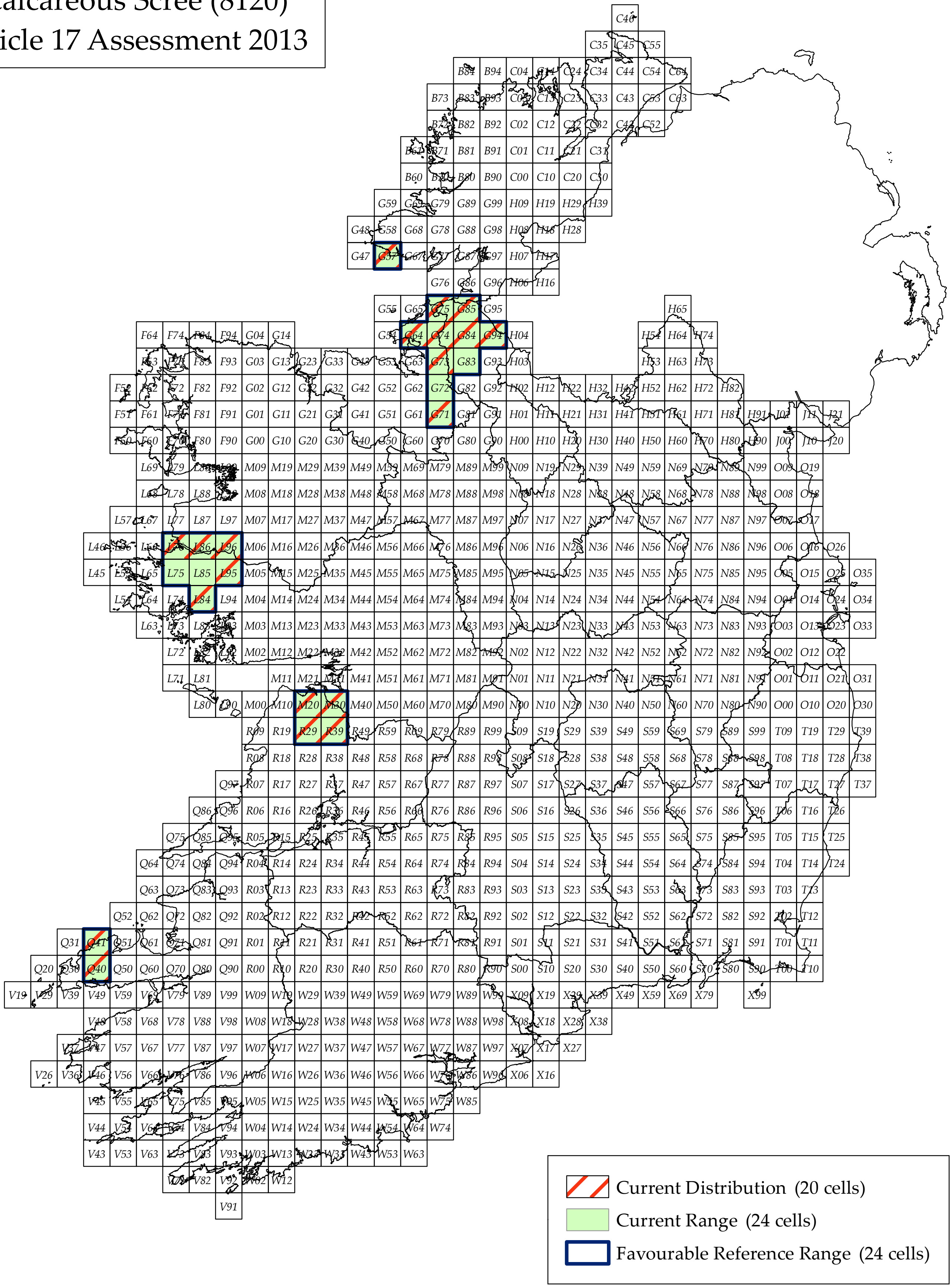
Field label	Note
Habitat code: 8120	
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. No information relevant to this habitat was recorded in the NPWS Site Inspection Report database. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of climate change and hill-walking. Climate change is predicted to impact on the occurrence of arctic-alpine plants in Ireland (Wyse Jackson 2008, Hodd 2012). Some of these are found in high-quality examples of this habitat. As effects from climate change in the next 12 years are likely to be small, the threat is assessed as low, although in the longer term this could be a more significant threat. Climate change may also create new threats in terms of invasive species. Hill-walking has not been noted as an issue within this particular habitat during the NSUH, but the current trend for increased recreational use of the uplands poses a threat particularly to areas of mobile scree and those near popular routes.
2.6.01 Method used - Threats	Modelling of distributions of arctic-alpine plants in Irelands has been conducted by Hodd (2012).
2.7 Complementary information	The list of typical species was based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement.
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover three of the major sites for this habitat in Ireland. A total of 15 monitoring stops were recorded across these sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. The main reasons for failure where lack of ferns and saxifrages, lack of other positive indicator species, presence of negative indicator species and disturbance. 1. No. of indicative ferns and Saxifraga species ≥1 (26.7%) 2. No. of positive indicator species present ≥1 (26.7%) 3. Cover of dwarf shrubs and grass species <20% (6.7%) 4. Proportion of vegetation composed of negative indicator species <1% (13.3%) 5. Proportion of vegetation composed of non-native species <1% (6.7%) 6. Cover of Pteridium aquilinum, native trees and scrub <25% (0.0%) 7. Leaves of forbs and shoots of dwarfs shrubs browsed or grazed <50% (0.0%) 8. Disturbed ground in the relevé <10% (8.3%) 9. Disturbed ground in the local vicinity <10% (16.7%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is approximately equal to the FRV for area although the FRV may change following future fieldwork. There is no indication of any significant current change.

Field label	Note
Habitat code: 8120	
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 15 monitoring stops recorded in this habitat by the NSUH, 5 stops (33%) failed mainly due to the lack of ferns and saxifrages at 27% of monitoring stops. Although the failure rate is over the 25% threshold a Unfavourable inadequate assessment was assigned on the basis of an imprecise understanding of the ecology and the requirement to review the assessment criteria. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	As one of the main impacts on this habitat is grazing, a qualifier of "+improving" could be applied due to the Commonage Framework Plans (CFP). Note, however, that the CFP does not provide data specific to habitat 8120 and has had limited monitoring. The NSUH is a baseline survey and so has provides no data on trends. Note also that improvements due to lower grazing levels are may be tempered by other ongoing impacts. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no fieldwork was actually conducted; there is no evidence that status has actually declined since this time. Therefore the qualifier is set as stable.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Poor prospects, future prospects is assessed as U1-inadequate. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007); there is no evidence that status has actually declined since this time. Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / =FRV / =stable / =FRV / Good S&F / <FRV / =stable / <FRV / Poor
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	All parameter are stable, therefore the qualifier for future prospects is set as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U1 – Inadequate, the overall assessment is U1-inadequate.
2.8.06 Overall trend in Conservation Status	The qualifier for the Overall assessment has been set as stable. Improvements may arise from the CFPs, however this must be balanced with the lack of knowledge of whether Epilobium brunnescens will spread.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.

Habitat code: 8120

Field label	Note
3.2 Conservation measures	The majority of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). Widespread destocking occurred in the uplands c. 2002 as part of the Commonage Framework Plans (CFP) and these restrictions are still in place (2.1). Due to their widespread impact and the scale of the destocking, the CFP must undoubtedly have had a major positive impact overall on grazed habitats in the uplands during this reporting period which had previously been in a generally very poor condition, following many years of high sheep densities. However, there is also geographical variation in recovery success and a considerable time lag between changes in stocking levels and signs of recovery in the vegetation (A. Bleasdale pers. comm.). Monitoring, in terms of bare peat, cover, heather height and coverage etc., has also been limited to a selected number of cSACs and some of the mostly badly damaged areas elsewhere. It is not known how serious the presence of Epilobium brunnescens is for the future of this habitat as little research appears to have been undertaken in a European context. No measures are being undertaken to control this species. It is also not known what the best strategy for removal of the plant would be (1.3). It is speculated that removal would be expensive, difficult and time- consuming given the small nature of the plant and the difficulty of access to the habitat. Recurrent management would almost certainly be needed.

Calcareous Scree (8120)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8210
NAME: Calcareous rocky slopes with chasmophytic vegetation

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

BSBI Maps Scheme: http://www.bsbimaps.org.uk/atlas/main.php

Derwin, J. (2004) Survey and evaluation of blanket bogs for proposal as Natural Heritage Areas. Unpublished report prepared for the National Parks and Wildlife Service.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Hodd, R.L. (2012) A study of the ecology of the oceanic montane vegetation of western Ireland and its potential response to climate change. Unpublished PhD thesis, NUI Galway, Ireland.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NBDC Biodiversity data: http://www.biodiversityireland.ie/biodiversity-data/access-biodiversity-data/

NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., Roche, J.R. & Barron, S.J. (2011) National Survey of Upland Habitats (Phase I, 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 II, 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., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. 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. 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. (2013c). 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. (2013d). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013e). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.

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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. (2010) 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.

Scannell, M.J.P. & Jebb, M.H. (2000) Flora of Connemara and the Burren – Records from 1984, Glasra 4, 7-45
Webb, D.A. & Scannell, M.J.P. (1983) Flora of Connemara and the Burren, Royal Dublin Society and Cambridge University Press, Cambridge.

Wyse Jackson, P.S. (2008) The potential impact of climate change on native plant diversity in Ireland. Online at: http://www.botanicg ardens.ie/news/20080122.htm Date accessed: 25 April 2013.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	11000	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	11000
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	2.85		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	approximately equal to (≈)	
	unknown	No	
	method	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. Whilst 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.

2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	medium importance (M)	N/A
Mining and quarrying (C01)	low importance (L)	N/A
mountaineering & rock climbing (G01.04.01)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats	modelling (2)

2.7 Complementary Information

2.7.1 Species

Alchemilla alpina
Asplenium adiantum-nigrum
Asplenium ruta-muraria
Asplenium trichomanes
Asplenium viride
Carex pulicaris
Ceterach officinarum
Cystopteris fragilis
Draba incana
Dryas octopetala
Hieracium spp. (count as one)
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

Tortella tortuosa

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop at least three typical species were required to be present, with at least one of the species being a fern or saxifrage. As this was a baseline survey, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	2.7.5 Entry Area of habitat within SAC network = 2.43 km2 Area of habitat outside SAC network = 0.42 km2 Area of habitat within SAC network that is QI = 2.14 km2 Area of habitat within SAC network that is not QI = 0.28 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Favourable (FV) qualifiers N/A
2.8.3 Specific structures and functions (incl Species)	assessment Inadequate (U1) qualifiers stable (=)
2.8.4 Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)
2.8.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3.1.1 Surface area (km²)	min	2.43	max	2.43
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	medium importance (M)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Habitat code: 8210	
0.2 Habitat code	Habitat 8210 Calcareous rocky slopes has been defined in an Irish context by Perrin et al. (2013a). It consists of vertical or near vertical exposures of calcareous bedrock with cracks, fissures and overhangs that support chasmophytic vegetation. In may also occur on wet siliceous cliffs where there is some base-enrichment from the water or where the siliceous rock has been metamorphosed. Chasmophytic vegetation is characterised by calcicole ferns (e.g. Asplenium viride, Cystopteris fragilis), saxifrages (Saxifraga oppositifolia, Saxifraga aizoides) and saxicolous bryophytes (e.g. Tortella tortuosa, Orthothecium rufescens) which are present due to the specific habitat conditions provided by the rock face and fissures. Areas of heath, grassland or tall herb communities growing on the rock face or on ledges are not included. The definition of this habitat has been revised since the 2000-2006 reporting period (NPWS 2007) in that whilst the presence of arctic-alpine species indicates high quality examples of this community, it is not deemed a requisite.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. The core area of this habitat is the Dartry Mountains in Sligo and Leitrim and the Bricklieve Mountains/Keshcorran in southern Sligo, where it occurs in the context of calcareous uplands. There are also occurrences in the limestone uplands of the Burren. Outlying locations represent small examples of the habitat largely in the context of metamorphosed siliceous rocks or base-rich conglomerate. Due to the incomplete nature of the National Survey of Upland Habitats (NSUH) it is highly likely that other outlying locations for this habitat remain to be located.

Field label	Note
Habitat code: 8210	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat 8210, Fossitt code ER2 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). Botanical Society of the British Isles (BSBI) map scheme. Species records. Burren National Park Habitat Map. An NPWS habitat mapping project. Habitat information is based on a broad habitat map of the wider Burren area, which was prepared in 2006, together with other maps of varying ages. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. Flora of Connemara and the Burren (Webb & Scannell 1983). Species records 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. National Biodiversity Data Centre (NBDC) biodiversity data. Species records. National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these. NPWS (2007) GIS shapefiles created during the previous assessment of habitats. Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available. Polygons were clipped to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. Where specific areas of rocky slope had been mapped, these polygons superseded those denoting NHA, pNHA or cSAC site boundaries. 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 also included for which the NBDC online database had records of Orthothecium rufescens. Hectads were included as centroids for the relevant squares in a point shapefile. For large designated sites listed by the HAP for habitat 8210 but for which no specific areas of rocky slope had been mapped, the point shapefile was used to mark locations where this habitat may occur based on information in the site synopses and through examination of the Ordnance Survey Discovery Series Maps in raster format. Additional locations where added

Habitat code: 8210

Field label	Note
	to the point shapefile after discussions with Dr. Rory Hodd and also from species records in Webb & Scannell (1983) and Scannell & Jebb (2000). Point records for Wicklow were included in the dataset in preference to the draft Vegetation and habitat survey of Wicklow Uplands cSAC [O'Donovan G., (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service].
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The earliest date of the species records data used in 1959. The database does not allow the correct time period of 1959-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at ten of the fourteen sites surveyed (Roche et al. 2009, 2010, 2012a, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Hodd (2012) reports on modelling of the effects of climate change on arctic-alpine species in the uplands. Webb & Scannell (1983) and Scannell & Jebb (2000) are floras detailing locations of indicator species in Connemara. Wyse Jackson (2008) is a consideration of the impacts of climate change on plant diversity in Ireland. BSBI Maps Scheme NBDC Biodiversity data had records of specific species as detailed in section 1.1.2.
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for two of this habitat's main sites, Ben Bulben, Gleniff and Glenade Complex cSAC and Arroo Mountain cSAC, but only partial data exists for other sites in the core habitat area of Sligo and Leitrim, and for several outlying locations in Donegal, Galway, Mayo and Kerry. As noted above, due to the incomplete nature of the National Survey of Upland Habitats (NSUH) it is highly likely that other outlying locations for this habitat remain to be located. Orthothecium rufescens records were included following a review by NPWS.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.

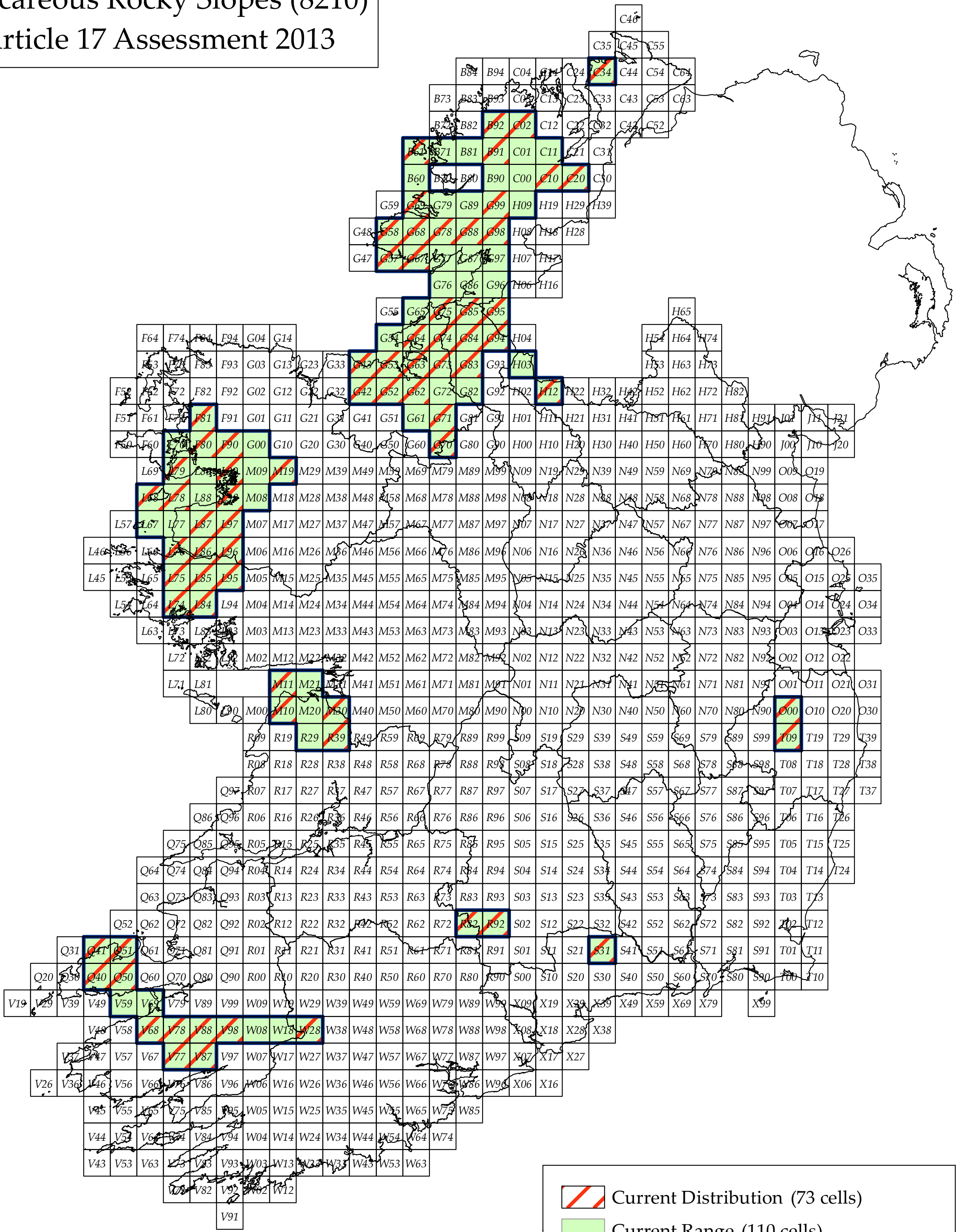
Field label	Note
Habitat code: 8210	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 13,200 km2. The loss of squares from the range is due in part to the use of more localised records rather than using just designated site boundaries (e.g. Wicklow Mountains, Comeragh Mountains).
2.3.10 c) Reason for change - use of different method	The difference is range is also because the 2007 report included all squares with north and north-east facing slopes that were above 350 m in elevation and greater than 40° in slope. As the vast majority of these slopes are siliceous in nature, it is likely that this overestimated the range. This data layer was not used in compiling the map for the present report. Furthermore, when the 2007 range was calculated, small gaps (less than 2 squares) were not included.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile and point shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat; the mean percentage was 7%. For polygons from other sources that mapped specific areas of this habitat, habitat percentages were initially calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 8210 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. However this resulted in a mean percentage of 43% for polygons from non-NSUH sources which would led to an implausibly high estimate for total habitat area (10.48 km2). Instead, the 7% figure from NSUH data was used across the board as an estimate for non-NSUH sources. For designated sites with no localised polygon records a habitat percentage of 0.01% was used; this estimate is based on the mean percentage coverage for this habitat for the NSUH sites where this habitat was recorded from predominantly siliceous bedrock areas. Area based on this 0.01% was assigned to the polygon for smaller sites. For larger sites, represented by point locations, area was assigned nominally to one of those point locations. For point records of the habitat outside designated sites a nominal area of 100 m2 was assigned. Points representing hectad species records did not contribute area. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	At the sample of sites covered by the NSUH there is no apparent loss of habitat since 2001. Minor losses due to quarrying and grazing are possible prior to 2001
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 0.75 km2. More accurate knowledge of the area of habitat 8210 is available from the NSUH for selected sites. Also additional areas in the Burren have been included.
2.4.13 c) Reason for change - use of different method	For the 2007 report, the area was calculated based on data from a Digital Terrain Model using polygons defined by criteria of north and north-east facing slopes, slope of more than 65 degrees and elevation above 350 m. Areas of both calcareous in Sligo and Leitrim and siliceous geology elsewhere were included.

Field label	Note
Habitat code: 8210	
2.5 Main pressures	Sheep grazing is widespread at most of the sites surveyed by the NSUH and often problematic, but is deemed to be of medium importance for this habitat due to its generally inaccessible nature. Although it does not currently occur at abundances at which it would be likely to be outcompeting native species, Epilobium brunnescens was recorded very frequently within this habitat and is likely to be spreading. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources (C. Douglas pers. comm.).
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. No information relevant to this habitat was recorded in the NPWS Site Inspection Report database. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of climate change, mining and quarrying, and rock-climbing. Climate change is predicted to impact on the occurrence of arctic-alpine plants in Ireland (Wyse Jackson 2008, Hodd 2012). Some of these are found in high-quality examples of this habitat. Extreme rainfall events may also impact this habitat by washing soil out of crevices (C. Douglas pers. comm.). As effects from climate change in the next 12 years are likely to be small, the threat is assessed as low, although in the longer term this could be a more significant threat. Small scale quarrying has impacted on this habitat in the past. Rock-climbing has not been noted as an issue within this particular habitat during the NSUH, but the current trend for increased recreational use of the uplands poses a threat particularly to areas with easier access.
2.6.01 Method used - Threats	Modelling of distributions of arctic-alpine plants in Irelands has been conducted by Hodd (2012).
2.7 Complementary information	The list of typical species was based on the list presented in the UK's JNCC Common Standards Monitoring (JNCC 2009) and was adapted for Irish vegetation communities using expert judgement.

Field label	Note
Habitat code: 8210	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete, but the monitoring stops do cover three of the major sites for this habitat in Ireland. A total of 25 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. Over a third of monitoring stops failed the criteria on non-native species due to more than 1% of the vegetation comprising Epilobium brunnescens. 1. No. of indicative ferns and Saxifraga species ≥1 (4.0%) 2. No. of positive indicator species present ≥3 (16.0%) 3. Proportion of vegetation composed of non-native species <1% (36.0%) 4. Cover of Pteridium aquilinum, native trees and scrub <25% (0.0%) 5. Leaves of forbs and shoots of dwarfs shrubs browsed or grazed <50% (0.0%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is approximately equal to the FRV for area although the FRV may change following future fieldwork. There is no indication of any current cha
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 25 monitoring stops recorded in this habitat by the NSUH, 9 stops (36%) failed. This failure rate is over the 25% threshold hence a U2 – Bad assessment is suggested. However, on review it was decided that a U1 – Inadequate assessment was more appropriate due to lack of knowledgeof the severity of the threat posed by Epilobium brunnescens, the presence of this invasive being one the main reasons for stop failing. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no field; there is no evidence that status has actually declined since this time.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Although a qualifer of stable is set for Structure and Functions, a note of caution must be given to the potential further spread of Epilobium brunnescens. The NSUH is a baseline survey and so has provides no data on trends. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no field survey had been undertaken.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Poor prospects but none have Bad prospects, future prospects is assessed as U1 – Inadequate. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007). Parameter Actual Status Future trend Future status Prospects Range =FRV =stable =FRV Good Area =FRV =stable =FRV Good S&F <FRV =stable <FRV Poor

Field label	Note
Habitat code: 8210	
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As all of the parameters are assessed as stable the qualifier for Future Prospects is assessed as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U1 – Inadequate, but none are assessed as U2-Bad the overall assessment is U1 – Inadequate.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate. The qualifier for the Overall status is set as stable.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.
3.2 Conservation measures	The majority of this habitat is probably within the Natura 2000 network, but not all of this area is listed as a QI and therefore does not have strict legal protection (6.3). Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). It is not known how serious the presence of Epilobium brunnescens is for the future of this habitat as little research appears to have been undertaken in a European context. No measures are being undertaken to control this species. It is also not known what the best strategy for removal of the plant would be (1.3). It is speculated that removal would be expensive, difficult and time- consuming given the small nature of the plant and the difficulty of access to the habitat. Recurrent management would almost certainly be needed.

Calcareous Rocky Slopes (8210)
Article 17 Assessment 2013



Current Distribution (73 cells)

Current Range (110 cells)

Favourable Reference Range (110 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8220

NAME: Siliceous rocky slopes with chasmophytic vegetation

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Barron, S. & Perrin, P. (2010) Review and amendment of GIS mapping for blanket bog NHAs. Unpublished report to National Parks & 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 & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Derwin, J. (2004) Survey and evaluation of blanket bogs for proposal as Natural Heritage Areas. Unpublished report prepared for the National Parks and Wildlife Service.

European Commission (2007) Interpretation manual of European Union habitats EUR 27, European Commission, DG Environment.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

Hodd, R.L. (2012) A study of the ecology of the oceanic montane vegetation of western Ireland and its potential response to climate change. Unpublished PhD thesis, NUI Galway, Ireland.

JNCC (2009) Common Standards Monitoring Guidance for Upland Habitats. Joint Nature Conservation Committee, Peterborough.

NPWS (2007) The status of EU protected species and habitats in Ireland, Volume 3, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Perrin, P.M., O'Hanrahan, B., Roche, J.R., Barron, S.J. (2009) Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland, Report submitted to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2013a.) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 48. 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. 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. (2013c). 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. (2013d). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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. (2013e). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft 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.

Perrin, P.M., Roche, J.R., Barron, S.J., Daly, O.H., Hodd, R.L., Muldoon, C.S. & Leyden, K.J. (2013f). National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 14: Slieve League cSAC (000189), Co. Donegal. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

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. (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.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2011a) 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.

Roche, J.R., Perrin, P.M. & Barron, S.J. (2011b) National Survey of Upland Habitats (Phase 1, 2010 - 2012), Site Report No. 5: Nephin Mountain Co. Mayo. 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. (2012b) 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.

Roche, J.R., Perrin, P.M., Barron, S.J. & Daly, O.H. (2012b) National Survey of Upland Habitats (Phase 2, 2011-2012), Site Report No. 8: Killarney National Park, Co. Kerry. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Wyse Jackson, P.S. (2008) The potential impact of climate change on native plant diversity in Ireland. Online at: http://www.botanicg ardens.ie/news/20080122.htm Date accessed: 25 April 2013.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	15800	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	15800
	operator	N/A
	unknown	No
	method	The favourable reference range is based on the premise used in the 2007 report that the current estimate of range is the favourable reference range 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.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	16.13		
2.4.2 Year or period	2007-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)		
	operator	approximately equal to (≈)	
	unknown	No	
	method	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. Whilst 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.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	low importance (L)	N/A
mountaineering & rock climbing (G01.04.01)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A

2.5.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
non intensive sheep grazing (A04.02.02)	low importance (L)	N/A
mountaineering & rock climbing (G01.04.01)	low importance (L)	N/A
Air pollution, air-borne pollutants (H04)	low importance (L)	Acid input/ acidification (A)
		Nitrogen input (N)
invasive non-native species (I01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Changes in biotic conditions (M02)	low importance (L)	N/A

2.6.1 Method used – threats: modelling (2)

2.7 Complementary Information

2.7.1 Species

Asplenium adiantum-nigrum
Athyrium filix-femina
Blechnum spicant
Dryopteris spp. (count separately)
Hymenophyllum tunbridgense
Hymenophyllum wilsonii
Saxifraga spathularis
Sedum rosea

2.7.2 Species method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop at least one typical species was required to be present. As this was a baseline survey, trends for the assemblage and for individual species were not assessed.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	Area of habitat within SAC network = 16.13 km2 Area of habitat outside SAC network = 15.72 km2 Area of habitat within SAC network that is QI = 0.42 km2 Area of habitat within SAC network that is not QI = 12.38 km2

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.8.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.8.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage _conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	15.72	max	15.72
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
No measure known/ impossible to carry out specific measures (1.3)	Recurrent	medium importance (M)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 8220	
0.2 Habitat code	Habitat 8220 Siliceous rocky slopes has been defined in an Irish context by Perrin et al. (2013a). It consists of vertical or near vertical exposures of siliceous bedrock with cracks, fissures and overhangs that support chasmophytic vegetation. Chasmophytic vegetation is characterised by calcifuge ferns (e.g. Dryopteris dilatata, Hymenophyllum wilsonii), saxifrages (Saxifraga spathularis) and saxicolous bryophytes (e.g. Andreaea spp., Racomitrium heterostichum) which are present due to the specific habitat conditions provided by the rock face and fissures. Areas of heath, grassland or tall herb communities growing on the rock face or on ledges are not included. The definition of this habitat has been revised since the 2000-2006 reporting period (NPWS 2007) in that whilst the presence of arctic-alpine species indicates high quality examples of this community, it is not deemed a requisite.
1.1.01 Distribution map	This map represents an intersection of habitat occurrences with a 10 km x 10 km grid using the ETRS89 LAEA 5210 projection. This habitat occurs mainly in the western counties from Cork up to Donegal and also in parts of the southeast and east.

Field label	Note
Habitat code: 8220	
1.1.02 Method used - map	The distribution map is derived from a polygon shapefile and a point shapefile. These shapefiles were created by compiling relevant data which referred to habitat habitat 8220 or Fossitt code ER1 or a relevant NPWS habitat code in their attributes. Available data sources were reviewed and data were extracted from the following sources: Blanket Bog NHA Survey. An NPWS habitat survey of 79 blanket bog NHAs completed 2003-2004. Original GIS compiled by Derwin (2004) and this was amended by Barron & Perrin (2010). 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. Conservation Planning Unit (CPU) habitats are preliminary or indicative habitat maps as derived in the drafting of Conservation Plans/Conservation Statements for Natura2000 sites by NPWS. Habitat areas contained were derived using the best available desktop information at the time of plan preparation. As such the dates of the maps are varied. 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 cNHAs. This table was used as a reference for incorporating polygon data for SACs, NHAs and pNHAs. Killarney National Park Habitat Map. An NPWS project based on field survey and aerial photograph interpretation. Completed between 2007 and 2011 (Barron & Perrin 2011). National Survey of Upland Habitats. An NPWS project mapping and assessing the conservation status of Annex I habitats in upland areas (Perrin et al. 2013a). Assessments have been carried out at fourteen sites with habitat mapping based on field surveys being carried out at thirteen of these. NPWS (2007) GIS shapefiles created during the previous assessment of this habitat. Uplands and Peatlands Grazing Survey. GIS files for this NPWS project, completed in 2011, were available. Polygons were clipped to remove overlaps. Each polygon was given a certainty value (0-3) and this, together with expert judgement, was used to determine which took precedence. Where specific areas of rocky slope had been mapped, these polygons superseded those denoting NHA, pNHA or cSAC site boundaries. For designated sites listed by the Habitat Assignment Project (HAP) for habitat 8220 but for which no specific areas of rocky slope had been mapped, the point shapefile was used to mark locations where this habitat may occur based on information in the site synopses and through examination of the Ordnance Survey (OS) Discovery Series Maps in raster format. Points from the Killarney

Field label	Note
	National Park Map were added to the point shapefile. For the last report (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. A comparison of these polygons with the OS Discovery Series Maps suggests that these polygons do not accurately map the extent of suitable habitat. Nor is the habitat limited to locations defined by these parameters, which were guided at the time by the focus on arctic-alpine species. They do however give a nationwide estimate of where the better examples of this habitat may be found. Points representing the centroids of these polygons were therefore also added to the point shapefile. Following a review by NPWS, points were also added for slopes on Slieve Snaght, Slieve Main, the Knockalla Mountains, Bulbin and the Urris Hills in northeast Donegal, an area where the DTM had not yielded any polygons. Polygons from the CPU were used in preference to the draft Vegetation and habitat survey of Wicklow Uplands cSAC [O'Donovan G., (2007) Vegetation and habitat survey of Wicklow Uplands cSAC. Unpublished draft report to the National Parks and Wildlife Service].
1.1.03 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
1.1.04 Additional distribution map	This additional distribution map represents an intersection of habitat occurrences with the Irish National Grid projection.
1.1.05 Range map	The distribution for the habitat was generated using the 'Species and Habitat types Range Tool'. This is an ESRI ArcGIS Ver. 10.0 Tool that : "...seeks to generate grid-based ranges in an automatic and consistent way, using as input the grid-based map of distribution that is derived from the locations of confirmed sightings/occurrences." [Urda, D. & Maxim, I. (2012) Species and Habitat types Range Tool Gap-filling algorithm. (European Topic Centre on Biological Diversity – http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software (Accessed 30/08/2012)]
2.2 Published sources	The National Survey of Upland Habitats is currently ongoing. The latest survey methodology and assessment criteria are presented in an updated version of the manual (Perrin et al., 2013a). Reports have been produced on a site-by-site basis with the habitat being recorded at each of the fourteen sites surveyed (Roche et al. 2009, 2010a,b, 2011a,b 2012a,b, Perrin et al. 2011, 2012, 2013b,c,d,e,f). NPWS (2007) includes the backing document, GIS shapefiles and final reporting form from the last assessment of this habitat. European Commission (2007) is the most recent interpretation manual for EU habitats. Fossitt (2000) is the Irish habitat classification system used by the majority of data sources for defining habitats. JNCC (2009) is a series of habitat monitoring guidelines for upland habitats and was used to inform the assessment criteria developed for this habitat. Hodd (2012) reports on modelling of the effects of climate change on arctic-alpine species in the uplands. Wyse Jackson (2008) is a consideration of the impacts of climate change on plant diversity in Ireland.

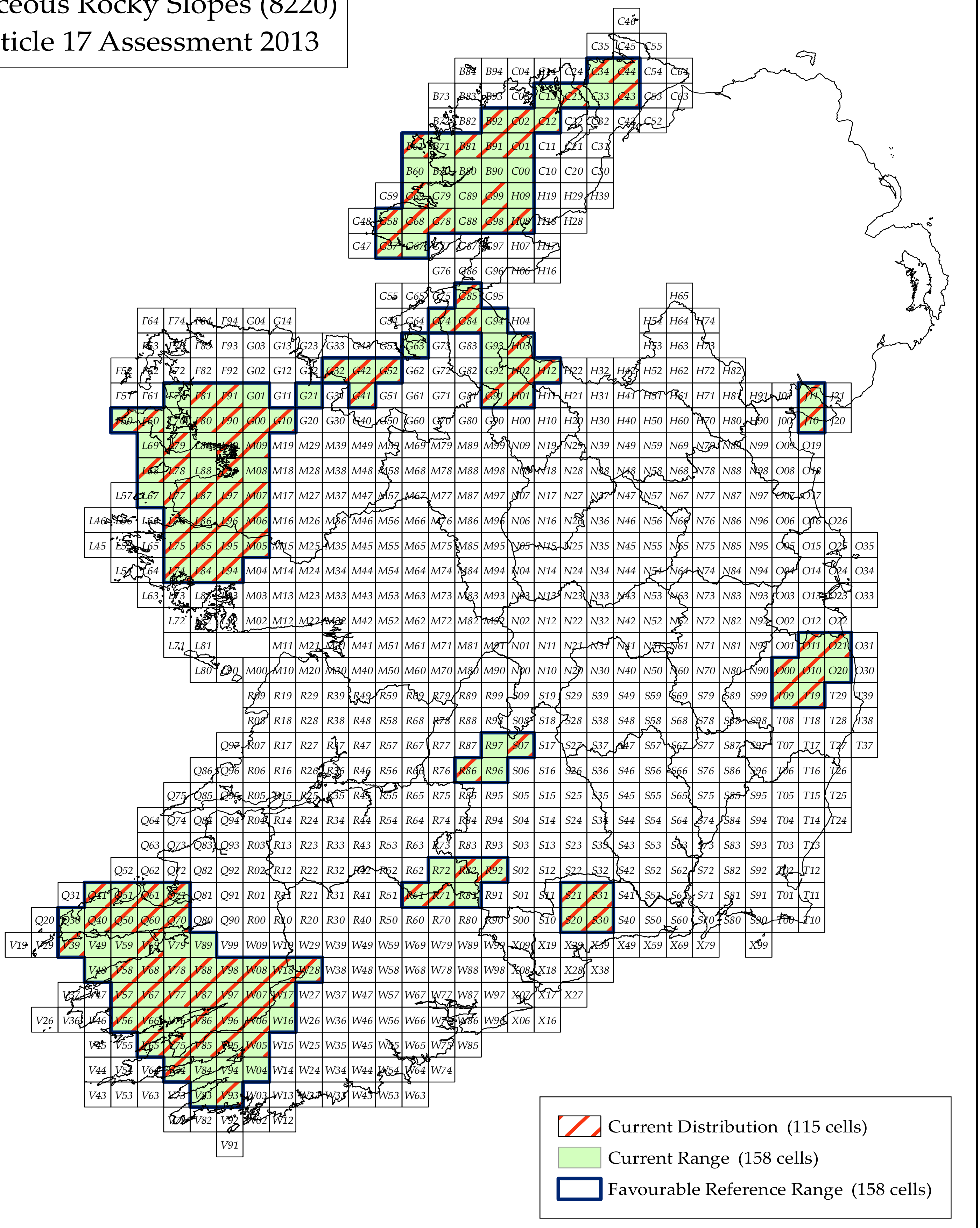
Field label	Note
Habitat code: 8220	
2.3.02 Method used - Range	Accurate mapping has been conducted by the NSUH for thirteen sites, all of which support habitat 8220 and include important sites for this habitat such Mount Brandon cSAC. The NSUH has so far concentrated mainly on the northwest of the country. Only partial data exists for a substantial number of remaining sites.
2.3.03 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.3.04 Short term trend - Trend direction	There is no evidence of a change in range since 2001.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Reported range in NPWS (2007) was 13,400 km2. Some squares have been lost from the range due to the use of more localised records rather than using just designated site boundaries (e.g. Wicklow Mountains, Carlingford Mountain).
2.3.10 c) Reason for change - use of different method	The increase in range is mainly due to the inclusion by the range tool of small gaps (2 squares or less) which were not included in 2007.
2.4.02 Year or period	The latest data used are from Phase 3 of the NSUH which were collected in 2012. The dates of the original survey work on which the CPU Habitats and Habitat Assignment Project are based (e.g. An Foras Forbartha and NPWS surveys) are varied but the bulk of the work would have been carried in the period 1975 to 1995. The database does not allow the correct time period of 1975-2012 to be entered so the reporting period has been entered.
2.4.03 Method used - Area covered by habitat	Area was calculated from the polygon shapefile used for distribution. As polygon data from the NSUH related to mosaics rather than solid blocks of habitat, the percentage of habitat within each polygon was used to calculate the actual area of habitat; the mean percentage was 8%. For polygons from other sources that mapped specific areas of this habitat (e.g. CPU), habitat percentages were initially calculated based on the number of habitats recorded for that polygon. For example, where a code relating to habitat 8220 was one of three habitat codes recorded for a polygon, a percentage of 33% was used. However this resulted in a mean percentage of 47% for polygons from non-NSUH sources which would led to an implausibly high estimate for total habitat area (66.3 km2). Instead, the 8% figure from NSUH data was used across the board as an estimate for non-NSUH sources. For designated sites with no localised records or point data a habitat percentage of 0.62% was used; this estimate is based on the mean percentage coverage for this habitat for NSUH sites at which this habitat was recorded. For each of the point records not intersecting within a polygon that was yielding an area, 2,000 m2 of habitat was estimated. The final figure presented is a rough estimate.
2.4.04 Short-term trend - Period	Recommended period for short-term trend is two reporting cycles.
2.4.05 Short-term trend - Trend direction	At the sample of sites covered by the NSUH there is no apparent loss of habitat since 2001.
2.4.07 Short-term trend - Method used	Accurate national figures for determining trend are not available. The NSUH is a baseline survey therefore assessments of area change were rough estimates. Also the survey has only covered a proportion of the national resource.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Reported area in NPWS (2007) is 2.00 km2. More accurate knowledge of the area of habitat 8210 is available from the NSUH for selected sites.
2.4.13 c) Reason for change - use of different method	For the 2007 report, the area was calculated based on data from a Digital Terrain Model using polygons defined by criteria of north and north-east facing slopes, slope of more than 65 degrees and elevation above 350 m.

Field label	Note
Habitat code: 8220	
2.5 Main pressures	Sheep grazing is widespread at most of the sites surveyed by the NSUH, but is deemed to be of low importance for this habitat due to its generally inaccessible nature. Although it does not currently occur at abundances at which it would be likely to be outcompeting native species, Epilobium brunnescens was recorded frequently within this habitat and is likely to be spreading. The current trend for increased recreational use of the uplands is a pressure particularly to areas with easier access for rock-climbers. Whilst there have been no specific studies on the effects of air pollutants on this habitat in Ireland it is deemed that nitrogen deposition and associated acidification are relevant to all upland habitats as they are subject to high precipitation rates. Nitrogen deposition may also encourage more nutrient-demanding species such as grasses at the expense of bryophytes etc. In general western districts would be less likely to incur nitrogen deposition due to prevailing westerlies and greater distance from potential sources (C. Douglas pers. comm.).
2.5.01 Method used - pressures	Impacts (pressures) were recorded for each habitat at each site surveyed by the NSUH. Importance rankings given here reflect the number of sites at which an impact was recorded, the area of habitat affected and the intensity of the impact. No information relevant to this habitat was recorded in the NPWS Site Inspection Report database. Additional pressures, particularly those which are more relevant outside the SAC network have been added through expert judgement.
2.6 Main threats	The list of threats is the same as the list of pressures with the addition of climate change. Climate change is predicted to impact on the occurrence of arctic-alpine plants in Ireland (Wyse Jackson 2008). Some of these are found in high-quality examples of this habitat. Extreme rainfall events may also impact this habitat by washing soil out of crevices (C. Douglas pers. comm.). As effects from climate change in the next 12 years are likely to be small, the threat is assessed as low, although in the longer term this could be a more significant threat.
2.6.01 Method used - Threats	Modelling of distributions of arctic-alpine plants in Irelands has been conducted by Hodd (2012).
2.7 Complementary information	The list of typical species is based on field observations during the NSUH. Blechnum spicant is a rather weak indicator as it can commonly occur in other upland habitats (e.g. dry heath). Sedum rosea also occurs in hydrophilous tall herb communities.
2.7.02 Typical species - method used	Typical species were assessed as an assemblage at the monitoring stop level within sites surveyed by the NSUH. At each monitoring stop at least one typical species was required to be present. As this was a baseline survey, trends for the assemblage and for individual species were not assessed.

Field label	Note
Habitat code: 8220	
2.7.04 Structure and functions - Methods used	The NSUH (Perrin et al. 2013a) assessed structure and functions at a monitoring stop level, 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 cSACs and is currently incomplete. A total of 43 monitoring stops were recorded across all sites. The criteria used and failure rates are presented below. For full details see the NSUH site reports and pilot study. Over 10% of monitoring stops failed the criteria on the non-native species, mainly because more than 1% of the vegetation comprised Epilobium brunnescens. A few stops failed due to absence of positive indicator species. 1. No. of positive indicator species present ≥1 (7.0%) 2. Proportion of vegetation composed of non-native species <1% (11.6%) 3. Cover of Pteridium aquilinum, native trees and scrub <25% (0.0%) 4. Leaves of forbs and shoots of dwarfs shrubs browsed or grazed <50% (2.9%)
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current range equals the FRV for range although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Current area is approximately equal to the FRV for area although the FRV may change following future fieldwork. There is no indication of any current change.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Of the 43 monitoring stops recorded in this habitat by the NSUH, 6 (14%) stops failed. This failure rate is between 1% and 25% and hence a U1 – Inadequate assessment was made. Equal weighting was given to each of the stops as each one assesses a comparable area of habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Although a qualifer of stable is set for Structure and Functions, a note of caution must be given to the potential further spread of Epilobium brunnescens. The NSUH is a baseline survey and so has provides no data on trends. A speculative assessment of U1 – Inadequate was made for the last reporting period (NPWS 2007) when no field survey had been undertaken.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As one or more of the parameters have Poor prospects but none have Bad prospects, future prospects is assessed as U1 - Inadequate. A speculative assessment of U1 – Inadequate was made for the last reporting round (NPWS 2007). Parameter / Actual Status / Future trend / Future status / Prospects Range / =FRV / =stable / =FRV / Good Area / =FRV / =stable / =FRV / Good S&F / <FRV / =stable / <FRV / Poor
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	As all of the parameters are assessed as stable the Future Prospects qualifier is therefore assessed as stable.
2.8.05 Overall assessment of Conservation Status	As one or more of the parameters are assessed as U1 – Inadequate but none as U2 – Bad, the overall assessment is U1 – Inadequate.
2.8.06 Overall trend in Conservation Status	The overall assessment in the last reporting round (NPWS 2007) was U1 – Inadequate. The qualifier for the overall assessment is set as stable.
3.1.01 a) Surface area - Minimum	The figure has been entered as a minimum but is actually an approximate figure.
3.1.01 b) Surface area - Maximum	The figure has been entered as a maximum but is actually an approximate figure.

Field label	Note
Habitat code: 8220	
3.1.02 Method used	Not all SACs within which this habitat is likely to occur have been mapped nor has monitoring of this habitat been established at all these sites.
3.2 Conservation measures	The majority of the estimated national resource of this habitat is within the Natura 2000 network; where the habitat is listed as a Qualifying Interest it is afforded legal protection under the Habitat Regulations (S.I. No. 477/2011) which regulates plans or projects that may negatively impact on the habitat. There is also a list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact the Qualifying Interest within an SAC. Enforcement of SAC protection and additional measures will be necessary to achieve FCS. The habitat is also afforded legal protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species (6.3). Environmental Impact Assessments (EIAs) conducted by the regulatory authorities protect the habitat from damage in the wider countryside (6.3). It is not known how serious the presence of Epilobium brunnescens is for the future of this habitat as little research appears to have been undertaken in a European context. No measures are being undertaken to control this species. It is also not known what the best strategy for removal of the plant would be (1.3). It is speculated that removal would be expensive, difficult and time- consuming given the small nature of the plant and the difficulty of access to the habitat. Recurrent management would almost certainly be needed.

Siliceous Rocky Slopes (8220)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
04-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8240

NAME: Limestone pavements

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2005-2011
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	Wilson, S. & Fernandez, 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. Anon. (2012) Annual report of the Burren Farming for Conservation Programme. Report submitted by the BFCP team to the National Parks and Wildlife Service of the Department of Arts, Heritage and the Gaeltacht. Dublin. Anon. (2011) Annual report of the Burren Farming for Conservation Programme. Report submitted by the BFCP team to the National Parks and Wildlife Service of the Department of Arts, Heritage and the Gaeltacht. Dublin. Anon. (2010) Technical Final Report of the BurrenLIFE Project 'Farming for Conservation in the Burren' . Report submitted by the Burren LIFE Project team to the National Parks and Wildlife Service of the Department of the Environment and Local Government. Dublin.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	9000	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	9000
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range as there is no evidence that there has been a decline since the directive came into force.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4.1 Surface area (km²)	321.85		
2.4.2 Year or period	2005-2011		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	decrease (-)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	
	operator	more than (>)
	unknown	No
	method	The current area is smaller than the Favourable Reference Area (FRA), the size of which is unknown. It would be larger than the current area as losses have been noted from field surveys and aerial photos since the Directive came into force. See Wilson & Fernandez (2013) for further details.
2.4.13 Reason for change	Genuine Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Mining and quarrying (C01)	high importance (H)	N/A
Landfill, land reclamation and drying out, general (J02.01)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
removal of hedges and copses or scrub (A10.01)	low importance (L)	N/A
intensive grazing (A04.01)	medium importance (M)	Nitrogen input (N)
stock feeding (A05.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
Trampling, overuse (G05.01)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Mining and quarrying (C01)	high importance (H)	N/A
Landfill, land reclamation and drying out, general (J02.01)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
problematic native species (I02)	medium importance (M)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
removal of hedges and copses or scrub (A10.01)	low importance (L)	N/A
intensive grazing (A04.01)	medium importance (M)	Nitrogen input (N)
stock feeding (A05.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
Trampling, overuse (G05.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Arabis hirsuta

Asplenium ruta-muraria

Asplenium trichomanes

Asperula cynanchica

Breutelia chrysocoma

Ceterach officinarum

Conocephalum conicum

Ctenidium molluscum

Cystopteris fragilis

Dryas octopetala

Dryopteris filix-mas

Epipactis atrorubens

Eupatorium cannabinum

Fissidens spp.

Geranium robertianum

Geranium sanguineum

Hedera helix

Helianthemum oelandicum

Juniperus communis

Mycelis muralis

Neckera crispa

Orchis mascula

Phyllitis scolopendrium

Plantago maritima

Polystichum aculeatum

Polystichum setiferum

Rhamnus cathartica

Rosa spinosissima

Rubia peregrina

Rubus saxatilis

Saxifraga hypnoides
Sesleria caerulea
Taxus baccata
Teucrium scorodonia
Thalictrum minus
Thymus polytrichus
Tortella tortuosa
Viola spp.
Adiantum capillus-veneris
Anacamptis pyramidalis
Anemone nemorosa
Antennaria dioica
Anthyllis vulneraria
Arctostaphylos uva-ursi
Arum maculatum
Atrichum undulatum
Blackstonia perfoliata
Brachypodium sylvaticum
Briza media
Bromus erectus
Calliergonella cuspidata
Calluna vulgaris
Campanula rotundifolia
Carex caryophyllea
Carex flacca
Carex pulicaris
Carex sylvatica
Carlina vulgaris
Centaurea scabiosa
Circaea lutetiana
Cladonia rangiformis
Conopodium majus
Corylus avellana
Crataegus monogyna
Dactylorhiza fuchsia
Dactylorhiza maculata
Daucus carota
Dicranum scoparium
Empetrum nigrum
Epipactis helleborine

Erica cinerea
Euonymus europaeus
Euphrasia spp.
Eurhynchium spp.
Festuca spp.
Filipendula vulgaris
Fragaria vesca
Fraxinus excelsior
Galium saxatile
Galium verum
Gentianella amarella
Gentianella campestris
Geum urbanum
Gymnadenia conopsea
Helictotrichon pubescens
Homalothecium lutescens
Hylocomium brevirostre
Hylocomium splendens
Hypericum pulchrum
Ilex aquifolium
Isothecium spp.
Kindbergia praelonga
Knautia arvensis
Koeleria micrantha
Leontodon hispidus
Leontodon saxatilis
Linum catharticum
Listera ovata
Lonicera periclymenum
Lotus corniculatus
Melica uniflora
Molinia caerulea
Neckera spp.
Neotinea maculata
Ophyrs apifera
Orchis morio
Origanum vulgare
Oxalis acetosella
Pilosella officinarum
Pimpinella saxifraga

Plagiochila spp.
Plagiomnium undulatum
Platanthera bifoliata
Platanthera chlorantha
Polygala vulgaris
Potentilla erecta
Potentilla sterilis
Primula veris
Primula vulgaris
Prunus spinosa
Ranunculus bulbosus
Ranunculus ficaria
Rhytidiadelphus squarrosus
Rhytidiadelphus triquetrus
Rubus fruticosus
Sanguisorba minor
Sanicula europaea
Scapania aspera
Scleropodium purum
Solidago virgaurea
Sorbus aucuparia
Spiranthes spiralis
Succisa pratensis
Thamnobryum alopecurum
Thuidium tamariscinum
Trisetum flavescens
Veronica chamaedrys

2.7.2 Species method used

Indicator species (positive and negative) were derived from cluster and indicator species analysis of the data collected during the project (see Wilson & Fernandez, 2013 for further details). The NPWS (2007) 8240 habitat conservation status assessment typical indicator species and EU Habitats Directive Interpretation Manual list of characteristic species for the habitat were also consulted.
Different indicator species were devised for each of the 5 different habitats surveyed; Limestone pavement (8240) exposed, Limestone pavement (8240) wooded, Semi-natural dry grasslands and scrub facies on calcareous substrates (6210), Alpine and Boreal Heaths (4060) and European Dry Heaths (4030). This lists have been merged here. For full, separate lists and monitoring methodologies, see Wilson & Fernandez (2013). The indicator species assessment for each of the habitats was as follows; for exposed limestone pavement (8240) the target was based on the presence of at least 7 positive indicator species, for wooded limestone pavement (8240) the target was based on the presence of at least 7 positive indicator species, for 6210 it was based on

	the presence of at least 2 high quality indicator species, as well as at least 7 positive indicator species, (including high quality indicator species), for 4030 and 4060 the target was based on the presence of at least 7 positive indicator species.
2.7.3 Justification of % - thresholds for trends	The overall assessment trend has been assessed as stable as, although there have been recent declines in the area of the habitat, measures have been put in place to improve the current land practices taking place in the Burren, the largest expanse of limestone pavement in Ireland. See Wilson & Fernandez (2013) for further information.
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	The area of habitat within the SAC network where it is listed as a Qualifying Interest is 259.34 km2.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Inadequate (U1)
	qualifiers	declining (-)
2.8.3 Specific structures and functions (incl Species)	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status		Inadequate (U1)
2.8.6 Overall trend in Conservation Status		stable (=)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	265.67	max	265.67
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Maintaining grasslands and other open habitats (2.1)	Contractual Recurrent	high importance (H)	Inside	Enhance Long term
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance Long term
Manage landscape features (6.4)	Contractual Recurrent	high importance (H)	Inside	Enhance Long term

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 8240	
0.1 Member State	Ireland
0.2 Habitat code	8240 Limestone pavements are both geologically and biologically important resources. The structure of limestone pavement consists typically of blocks of rock, known as clints, separated by fissures, or grikes. There is considerable variation: some areas consist of massive blocks of smooth, relatively un-weathered pavement with well-developed grike, other areas consist of shattered, rubble-strewn pavement. Limestone pavement can occur as large expanses of exposed rock, but also in a mosaic with the following habitats: calcareous grassland, heath, woodland and scrub. The habitat is found mainly in the west of Ireland with counties Clare, Galway and Mayo containing the largest extent. Smaller areas are found in Sligo, Leitrim, Donegal, Offaly, Kerry, Cavan, Limerick, Longford, Tipperary, Roscommon and Westmeath.
1.1.02 Method used - map	The national limestone pavement habitat distribution map was produced based on a revision of the original map completed as part of the Conservation Status Assessment report commissioned by NPWS in 2007. A revised map was produced following a pilot and national survey undertaken during the period 2008-2012, which employed both field surveys and a desk-top assessment of aerial photos. The updated map was produced in polygon shapefile format in ArcGIS 9.3 using the Irish National Grid as the co-ordinate reference system. The review was undertaking using the OSi 2005 Aerial ortho-photography as a background. Mapping was done at a 1:5,000 scale.
1.1.04 Additional distribution map	The national 10km grid habitat distribution map was produced by intersecting the overall national limestone pavement habitat map with the 10km grid. It shows 10km squares where the habitat is present. The Irish National Grid was used as the co-ordinate reference system.
1.1.05 Range map	Range maps were derived from the distribution maps referred to in 1.1.1 and 1.1.4 using the standardised Range tool.
2.2 Published sources	Wilson & Fernandez (2013) completed a detailed field survey of 26 limestone pavement and associated habitat monitoring sites and 17 proposed Natural Heritage Areas. A number of 100m x 100m (1ha) plots were selected within each monitoring site. The habitats within each plot were mapped using a GeoExplorer handheld GPS minicomputer (Trimble GeoXT). Within each plot a detailed species list was taken and at least one 1m x 1m relevé was recorded within each habitat type encountered. Other data recorded within each plot included management practices, notable species and pressures. Indicators were derived to assess structure and functions and future prospects at each monitoring site. For pNHA surveys, site notes were recorded throughout the site; each habitat type encountered was described, features of interest, pressures, fauna and notable species were also recorded. Data recorded during the pNHA survey, data from the Burren Life Project (Anon. 2010) and the Burren Farming for Conservation Project (Anon. 2011, Anon. 2012) were used in conjunction with the monitoring survey data
2.3.01 Surface area - Range	This figure was derived from the range map referred to in 1.1.5

Field label	Note
Habitat code: 8240	
2.3.02 Method used - Range	Range is defined as the area over which a species or habitat is usually found. For the purposes of this exercise, range is taken to be the outer limits of the overall area in which a habitat is found at present. It can be considered as an envelope within which areas actually occupied occur, as in many cases not all the range will be occupied by the habitat. The calculation of the habitat's current range should be based on the current national distribution map. Range is then depicted as those 10km grid (Irish National Grid) squares intersecting the national habitat distribution map (see Wilson & Fernandez (2013) for further details). The current range map in Irish Grid for Limestone Pavement (8240) was generated using 'Species and Habitat types Range Tool' version RangeTool.tbx which is the 'ESRI ArcGIS 10 Toolbox containing the Range tool for version 10.0, version 30/08/2012, downloaded from (http://bd.eionet.europa.eu/activities/Reporting_Tool/Reporting_Tool_Software)
2.3.04 Short term trend - Trend direction	There is no evidence to suggest changes in habitat range have taken place in the trend period; therefore, the short term trend in range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and range value derived from the 2008-2011 limestone pavement survey (Wilson & Fernandez 2013) is considered to be the Limestone Pavement baseline. As there is no evidence of a decline since the Directive came into force and there is no reason to assume that the area is not large enough to allow the long term survival of the habitat, the current range is set as the FRR.
2.4.01 Surface area	The new national limestone pavement and associated habitat map shows that the current habitat area is 32,185ha. This figure is smaller than the 2007 estimate, which was 36,000ha. This revision is a result of more accurate mapping of the habitat, although minor losses did occur. The area was calculated based on the digitising of areas of potential habitat using the 2005 OSi ortho-photographs as a background.
2.4.05 Short-term trend - Trend direction	Limestone pavement removal and incidences of land reclamation evident on the 2005 ortho-photographs indicates a high frequency of this type of activity occurring across the country. The national survey (2008 to 2011) also identified removal of limestone pavement at over 40% of the pNHA sites surveyed. Approximately 95ha of limestone pavement and associated habitats have been irreversibly damaged at these sites.
2.5 Main pressures	Pressures were recorded at each NSLP site on a three point scale (Low/Moderate/High). Pressures were also derived from other sources such as the OSI 2005 ortho-photographs, 2007-2009 NPWS Site Inspection Reporting, Burren Life Project (Anon. 2010) and Burren Farming for Conservation Project (Anon. 2011, Anon. 2012). The principal pressures are abandonment of pastoral systems, rock extraction/removal (mostly removal of superficial rocks), land reclamation (which typically involves bulldozing of rocks and importation of soil) and invasive native and non-native species. See Wilson & Fernandez (2013) for further details.
2.5.01 Method used - pressures	The principal data used were based on that collected from the National Survey of Limestone Pavement and the monitoring survey. The assessment of future prospects at national level was based on the results of the future prospects assessment results at site level within those sites included as part of the National Monitoring Survey. Information from the Burren LIFE Project (Anon. 2010) and the Burren Farming for Conservation Programme (Anon. 2012) and any other relevant sources was also taken into account. The data collected for the pNHA survey was also used. See Wilson & Fernandez (2013), for further details.

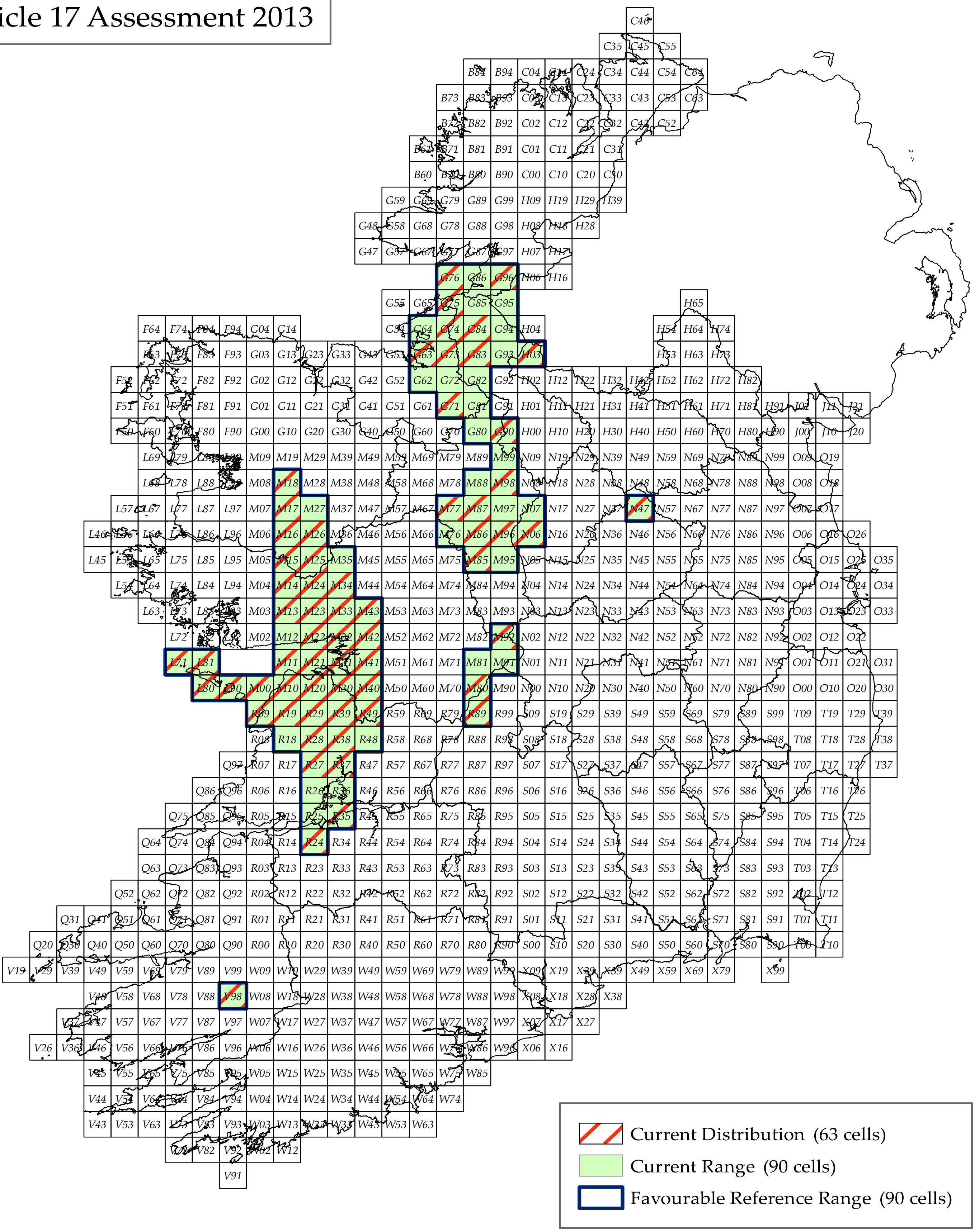
Field label	Note
Habitat code: 8240	
2.7.02 Typical species - method used	Indicator species (positive and negative) were derived from cluster and indicator species analysis of the data collected during the project (see Wilson & Fernandez (2013) for further details). The NPWS (2007) 8240 habitat conservation status assessment of typical indicator species and EU Habitats Directive Interpretation Manual list of characteristic species for the habitat were also consulted. Different indicator species were devised for each of the 5 different habitats surveyed; Limestone pavement (8240) exposed, Limestone pavement (8240) wooded, Semi-natural dry grasslands and scrub facies on calcareous substrates (6210), Alpine and Boreal Heaths (4060) and European Dry Heaths (4030). The lists have been merged here. For full, separate lists, see Wilson & Fernandez (2013). The indicator species assessment for each of the habitats was as follows; for exposed limestone pavement (8240) the target was based on the presence of at least 7 positive indicator species, for wooded limestone pavement (8240) the target was based on the presence of at least 7 positive indicator species, for 6210 it was based on the presence of at least 2 high quality indicator species, as well as at least 7 positive indicator species, (including high quality indicator species), for 4030 and 4060 the target was based on the presence of at least 7 positive indicator species.

Field label	Note
Habitat code: 8240	
2.7.04 Structure and functions - Methods used	The structure and function conservation status assessment for exposed limestone pavement (8240) was based on the following attributes: Presence of at least 7 positive indicator species; collective cover of negative indicators should be less than 1%; cover of bracken should be less than 10%; cover of non-native species should be less than 1%; cover of scrub species (Corylus avellana, Crataegus monogyna, Euonymus europaeus, Fraxinus excelsior, Ilex aquifolium, Prunus spinosa, Rhamnus catharticus, Rubus saxatilis, Rubus fruticosus agg., Rosa micrantha, Rosa spinosissima, Salix spp., Sorbus aria, Sorbus aucuparia, Viburnum opulus), should be less than 25%. The structure and function assessment for wooded limestone pavement (8240) was based on the following attributes: Presence of at least 7 positive indicator species; collective cover of negative indicator species should be less than 10%; total canopy cover >30%; total bryophyte cover ≥50%; no grazing pressure; dead wood present; absence of non-native shrub/tree regeneration. The structure and function assessment for semi-natural dry grasslands and scrubland facies on calcareous substrates (6210) was based on the following attributes: Presence of at least 2 high quality indicator species; presence of at least 7 positive indicator species, (including high quality indicator species); collective cover of negative indicator species should be no more than 20% and individual cover should be less than 1%; collective cover of non-native species should be less than 1%; forb component should be between 40 and 90%; collective cover of scrub and bracken should be no more than 10%; height of 30-70% of the sward should be 5-40cm; litter cover should be ≤ 25%, although this attribute was not assessed in the current survey; cover of disturbed ground no more than 10%. The structure and function assessment for Alpine and Boreal Heaths (4060) is based on the following attributes: Presence of at least 7 positive indicator species; pollective cover of negative indicator species should be no more than 1%; collective cover of non-native species should be no more than 1%; collective cover of trees and shrubs should be no more than 25%; cover of disturbed ground should be no more than 10%. The above attributes and targets for each habitat were established based on the monitoring methodologies which are discussed in detail in Wilson & Fernandez (2013). The national conservation assessment was based on the results of the structure and functions conservation status assessment at site level within those sites included as part of the National Monitoring Survey. Information from the Burren LIFE project (Anon. 2010), the Burren Farming for Conservation Programme and the data collected for the pNHA survey was also taken into account. See Wilson & Fernandez (2013), for further details.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current national range for Annex I Habitat 8240 is 9,000km2 (90 10 km cells). This differs from the range reported in 2007 which was 7,400 km2. This difference is a result of new methods which have been employed to calculate the range, generated by the European Topic Centre on Biological Diversity (IT Tool version 10.0). The apparent increase is also due to an improvement of the 10km grid habitat distribution map, as a result of improved habitat knowledge, rather than any actual change in extent (see Area section). The favourable reference range value is equal to the current range (9,000km2) as no changes in habitat range have taken place since the Directive came into force; therefore, the conservation status is assessed as Favourable and the trend Stable.

Field label	Note
Habitat code: 8240	
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The new national limestone pavement and associated habitat map shows that the current habitat area is 32,185ha. The 2005 ortho-photographs indicated a high frequency of limestone pavement removal occurring across the country. Although these activities occurred prior to 2005, the national survey (2008 to 2011) also identified removal of limestone pavement at over 40% of the pNHA sites (i.e. unprotected sites) surveyed as part of the project within the reporting period. Approximately 95ha of limestone pavement and associated habitats have been irreversibly damaged at these sites. Although an estimate of the habitat loss within the trend period cannot be given, it is likely to have been <1% per year and thus the habitat Area is given an Unfavourable Inadequate assessment. This attribute is given a decreasing trend due to these losses and as no measures have been put in place to halt further habitat loss.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The results of an overall assessment of the structure and function of the priority habitat 8240 taking into consideration the assessment given to its associated habitats (6210, 4030 and 4060) was Unfavourable Inadequate. The main reasons for this unfavourable assessment are negative indicator species, principally due to land abandonment, and the presence of non-native species.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Limestone pavement was assessed as Unfavourable Inadequate in 2007. Since then, measures have been put in place to improve land management practices in the Burren, the largest expanse of limestone pavement in Ireland (Anon. 2010, Anon. 2011, Anon. 2012). Therefore, the trend for structure and functions was assessed as improving, as the condition of the habitat is likely to improve in the future.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The results of an overall assessment of the future prospects of the priority habitat 8240 taking into consideration the assessment given to its associated habitats was Unfavourable Inadequate. Limestone pavement removal and quarrying, land reclamation, invasive non-native species, scrub encroachment, problematic native species and lack of grazing were deemed to be the main pressures. The last 3 threats are all associated with changes in agricultural practices, principally land abandonment. However, the Burren Farming for Conservation Programme is being implemented on 160 farms and covers over 14,600 ha within this region and this is helping to reverse the impact of undergrazing and scrub encroachment. It is hoped that it may be expanded to the rest of the Burren in the future. However, outside the Burren there is currently no programme to reverse the decline in quality of limestone pavement.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Limestone pavements were assessed as Unfavourable Inadequate in 2007. Due to recent inititatives in improved landuse management by the Burren Life Project (Anon. 2010) and Burren Farming for Conservation project (Anon. 2011, Anon. 2012) the status of current pressures and future threats such as inappropriate grazing regimes and scrub encroachment is likely to improve. However, no measures have been put in place to halt other pressures such as quarrying and land reclamation. These threats are, however, reletively insignificant a a national level. Therefore, the trend for future prospects was assessed as improving.

Field label	Note
Habitat code: 8240	
2.8.05 Overall assessment of Conservation Status	The detailed national survey by Wilson & Fernandez (2013) provided new figures for Range and Area. Range was assessed as Favourable. There is evidence of a minor decline in area so this is assessed as declining. Ecological data were analysed to assess the structure and functions and future prospects. Limestone pavement quarrying, land reclamation, scrub encroachment, invasive non-native species, problematic native species and lack of grazing were considered the main issues and resulted in an assessment of Unfavourable Inadequate for these attributes. The overall assessment has been assessed as Unfavourable Inadequate (stable) as, although there have been recent declines in habitat extent, measures have been put in place to improve the current land practices taking place in the Burren, the largest expanse of limestone pavement in Ireland. Further measures are needed to combat the issue of limestone pavement removal and land reclamation, particularly in areas with no means of legal protection. See Wilson & Fernandez (2013) for further information.
2.8.06 Overall trend in Conservation Status	The overall assessment trend has been assessed as stable as, although there have been recent declines in habitat, measures have been put in place to improve the current land practices taking place in the Burren, the largest expanse of limestone pavement in Ireland. See Wilson & Fernandez (2013) for further information.
3.1.03 Trend of surface area within the network	The majority of the Limestone pavement resource is within the SAC network. There appears to be a difference between impacting activities inside and outside the NATURA framework, with the majority of the loss due to land reclamation and quarrying, occurring outside the network. Therefore the trend within the NATURA network is considered to be stable.
3.2 Conservation measures	Limestone pavements that are listed as qualifying features in SACs are protected by the 2011 Habitats Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only approved if they do not negatively impact on the qualifying features within the SAC. Any damaging activity that impacts the conservation status of Limestone pavements is regulated under the Environment Liability Regulations 2008. Measures have been taken within the NATURA network to improve land-use management and to address such issues as scrub encroachment and inappropriate grazing. Further work is needed to tackle the problem of land reclamation and quarrying, particularly outside the NATURA framework.

Limestone Pavement (8240)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
10-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8310	
NAME: Caves not open to the public	

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published

Jones, G.L., Burns, G., Fogg T. and J. Kelly, J. (1977) The Caves of Fermanagh and Cavan. Florencecourt, Co. Fermanagh.
Kelleher, C. (2004) Thirty years, six counties, one species – an update on the lesser horseshoe bat Rhinolophus hipposideros (Bechstein) in Ireland. Ir. Nat. J. 27: 387-392.
McAney, C.M. (1994) The lesser horseshoe bat in Ireland – Past, Present and Future. Folia Zoologica. 43 (4): 387-392
Mitchell, AJ. & McLeish, AP. (2004) Bat worker’s manual. JNCC.
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.
O’Sullivan, P. (1994) Bats in Ireland. Special Zoological Supplement, The Irish Naturalist’s Journal.
Roche, N. 2001. The status of lesser horseshoe bats Rhinolophus hipposideros Bechstein in Co. Limerick. Ir. Nat. J. 26: 446-452.
Roche, N. Langton, S. & Aughney, T. (2012) Lesser horseshoe bat: population, trends and threats 1986-2012. Unpublished report to NPWS.
Self, CA (1981) The Caves of County Clare. University of Bristol Speleological Society.
Tratman E.K. & Hazleton M. (1974) Notes on the Irish Cave sites from which Fauna has been collected. CRG - Transactions Vol 15 (4) pp 217 – 220.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	4900	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	4900
	operator	N/A
	unknown	No
	method	The current range is taken as the favourable reference range. This area is believed to contain all the significant

	ecological variation of the habitat and to be large enough to allow the long term survival of the habitat in Ireland.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.005		
2.4.2 Year or period	2001-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	0.005	
	operator	N/A	
	unknown	No	
	method	The current area of the habitat is taken as the favourable reference area.	
2.4.13 Reason for change	Use of different method		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
Urbanised areas, human habitation (E01)	medium importance (M)	N/A
speleology (G01.04.02)	medium importance (M)	N/A
recreational cave visits (G01.04.03)	medium importance (M)	N/A
flooding (J02.04.01)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
Urbanised areas, human habitation (E01)	medium importance (M)	N/A
speleology (G01.04.02)	medium importance (M)	N/A
recreational cave visits (G01.04.03)	medium importance (M)	N/A
garbage and solid waste (H05.01)	medium importance (M)	N/A

flooding (J02.04.01)	medium importance (M)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Rhinolophus hipposideros

2.7.2 Species method used: There is little evidence that Irish caves support much in the way of specialised troglobite fauna, or highly endemic cave species. However, one of the species of bat found in Ireland is listed on Annex II and does occur in caves – the lesser horseshoe bat (Rhinolophus hipposideros). Consequently, in practice, this EU habitat is confined in Ireland to caves not open to the public, which host important numbers of lesser horseshoe bat.

2.7.3 Justification of % - thresholds for trends

2.7.4 Structure and functions - methods used: Estimate based on partial data with some extrapolation and/or modelling (2)

2.7.5 Other relevant information: NPWS field staff conduct annual monitoring at maternity and hibernation sites of Rhinolophus hipposideros. Although not all winter sites are known, approximately 100 sites throughout its range in the west of Ireland are surveyed every winter. Most of the sites included in the annual monitoring programme are known to be important for this species (holding >50 bats), but a proportion of the sites are also included where only a small number of droppings or individual bats have previously been recorded. Most of these minor roosts are at the edge of the bat's range in Ireland and by monitoring these on a regular basis (e.g. every 3 years) it is hoped to chart any changes in the species distribution. There are indications that this species is increasing in number (Roche et al. 2012).

16 of the caves fall within SACs where this habitat is an actual Qualifying Interest, covering an approximate area of 0.0016km2.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range
assessment Favourable (FV)
qualifiers N/A

2.8.2 Area
assessment Favourable (FV)
qualifiers N/A

2.8.3 Specific structures and functions (incl Species)
assessment Favourable (FV)
qualifiers N/A

2.8.4 Future prospects
assessment Favourable (FV)
qualifiers N/A

2.8.5 Overall assessment of Conservation Status: Favourable (FV)

2.8.6 Overall trend in Conservation Status: N/A

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.0022	max	0.0022
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

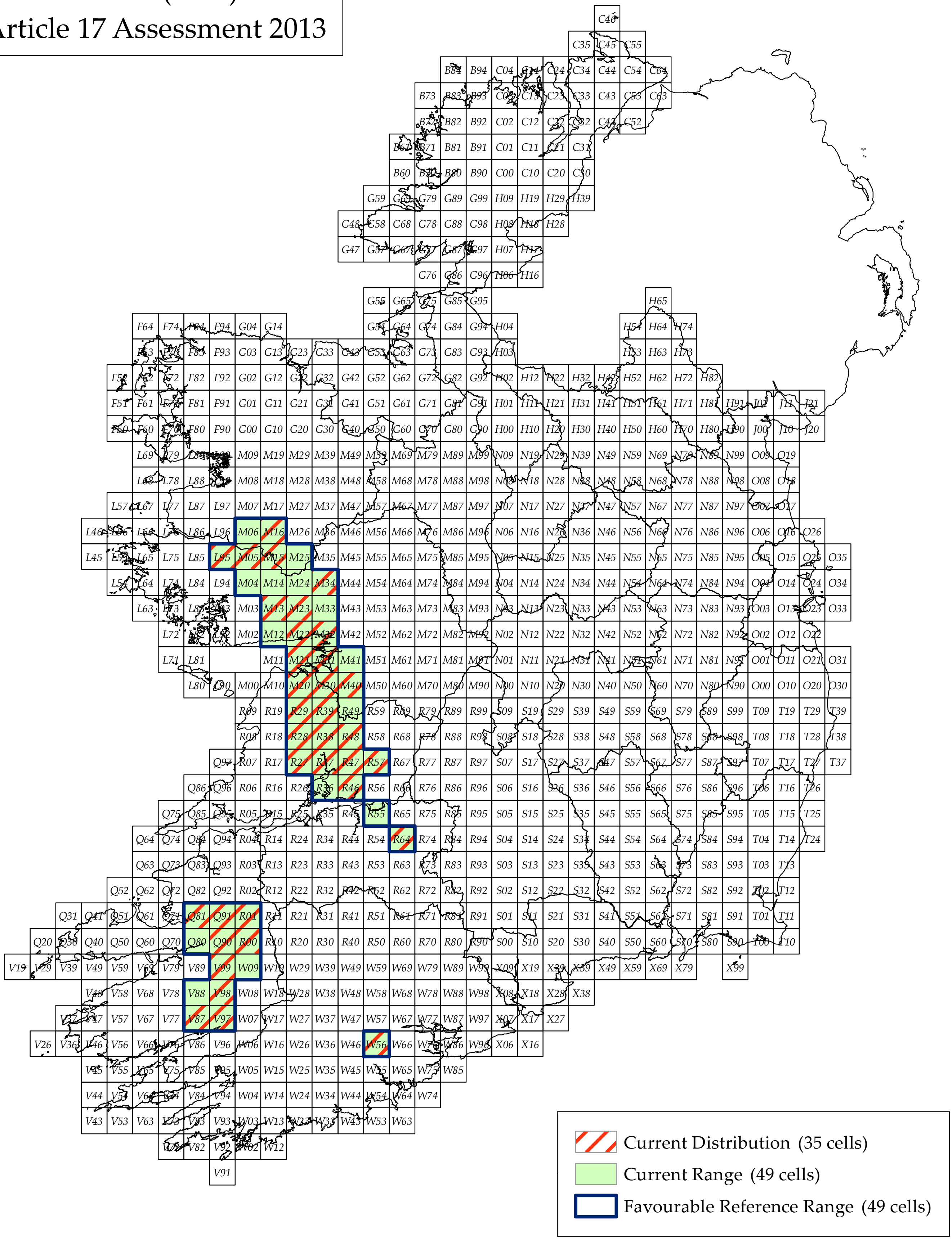
3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Adapt forest management (3.2)	Recurrent	medium importance (M)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Field label	Note
Habitat code: 8310	
0.2 Habitat code	The Interpretation Manual of EU Habitats defines this habitat as : "Caves not open to the public including …., hosting specialised or highly endemic species, or that are of paramount importance for the conservation of Annex II species (e.g. bats, amphibians)." There is little evidence that Irish caves support much in the way of specialised troglobite fauna, or highly endemic cave species. However, one of the species of bat found in Ireland is listed on Annex II and does occur in caves – the lesser horseshoe bat (Rhinolophus hipposideros). Consequently, in practice, this EU habitat is confined in Ireland to caves not open to the public, which host important numbers of lesser horseshoe bat. The lesser horseshoe bat is the only member of the Rhinolophidae occurring in Ireland (O' Sullivan, 1994) and was first recorded in Ireland in 1858 (McAney, 1994). It is confined to the west coast of Ireland in the counties of Cork, Kerry, Limerick, Clare, Galway and Mayo (McAney, 1994). Ireland represents the most northerly and westerly limits of the species' distribution (Roche, 2001). Maternity roosts do not occur in caves in Ireland, however individual lesser horseshoe bats may turn up in caves at any time of year. From September to November, bats leave summer roosts and go to hibernation sites for the winter. These hibernation sites are structures that maintain a constant low temperature throughout the winter, typically caves, but also souterrains, cellars and icehouses (O' Sullivan, 1994). Lesser horseshoe bats rely on linear landscape features such as treelines, stonewalls and hedgerows to navigate and commute from roosts to feeding sites, because, unlike other bat species, they do not fly out in the open (Motte & Libois, 2002). The bats forage predominantly in deciduous woodland and riparian vegetation normally within c. 3km of the roost (Motte & Libois, 2002).
2.3.01 Surface area - Range	Dr David Drew (TCD) has compiled a database of all the known caves in Ireland. He has made this data available to NPWS. 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 data from 2001 – 2012.
2.3.04 Short term trend - Trend direction	The range of the lesser horseshoe bat has remained stable in recent decades and consequently the range of this habitat is also stable.
2.3.07 Long-term trend - Trend direction	The assessment of the lesser horseshoe bat indicates a stable range since monitoring began in the mid 1980s. Consequently the long term trend for this habitat is taken as stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Monitoring of the lesser horseshoe bat during the current reporting period has led to some changes to the range which in turn has slightly modified the figure reported here.
2.3.10 c) Reason for change - use of different method	The different range tool employed for this assessment has produced some changes to the range.

Field label	Note
Habitat code: 8310	
2.4.01 Surface area	The measurement of this parameter is problematic. While extensive mapping surveys of some cave systems have been done and the length and area may be known (e.g. Jones et al. 1997; British Speleological Society, 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, each of the 50 caves used by lesser horseshoe bats has been given a nominal area of 100m2.
2.4.05 Short-term trend - Trend direction	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. Given that the range of the lesser horseshoe bat has remained stable in recent decades, the trend here is also taken as stable.
2.4.13 c) Reason for change - use of different method	In the previous assessment the area of distribution, was taken as the extent of habitat. In this assessment a nominal area of 100m2 has been assigned to each of the 50 known lesser horseshoe caves.
2.5 Main pressures	Pressures can relate to activities within the cave itself (e.g. dumping, disturbance due to cave visits), or to those adjacent to the cave which may impact directly on its structure (e.g road development), or indirectly on the suitability of the cave for lesser horseshoe bats (e.g. adjacent housing, clearance of woodland or other vegetation around the cave entrance).
2.6 Main threats	The current pressures are considered likely to continue into the future.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Range is equal to favourable reference range and is stable. This is parameter is considered favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	This area is equal to the favourable reference area and is stable. This parameter is therefore considered favourable.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The structures and functions of this habitat are taken to refer to the factors that make a cave suitable for bats, specifically lesser horseshoe bats. Of particular importance is that there are areas of the cave, accessible to bats, where there is relatively little variation in temperature and humidity (Mitchell & McLeish, 2004). Dumping of household and farmyard waste, disturbance (accidental or deliberate) by humans of roosting bats, and natural events such as flooding, have all been implicated in the loss of value of individual caves for bats. In some cases bat populations may abandon an underground site for less obvious reasons, perhaps due to subtle changes in air-flow patterns (K McAney pers. comm.). While there has been some work recently (e.g. Mitchell-Jones et al., 2007) to develop best practice guidelines specifically for the protection and management of underground bat roosts, more research to identify the particular factors that make caves suitable (or unsuitable) for lesser horseshoe bats is required. In the meantime, given that lesser horseshoes continue to occupy caves throughout their range in Ireland, with many sites holding over 100 bats, and monitoring data shows that lesser horseshoe bat numbers are increasing (Roche et al. 2012), this parameter can be assessed as favourable.

Field label	Note
Habitat code: 8310	
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although some threats have been identified, some of which might have appreciable localized effects, none of these is considered likely to have a significant impact on the overall status of this habitat in Ireland. The overall conservation assessment for the lesser horseshoe bat in Ireland is Favourable. Nine of the most important cave sites are protected as SACs. Many of the most important bat caves are already protected from disturbance through grilling. A programme is underway to identify further vulnerable cave sites and these will also be grilled. Overall the future prospects for this habitat are considered to be good.
2.8.05 Overall assessment of Conservation Status	The range and area of this habitat are at favourable reference values and stable. The overall conservation status of the lesser horseshoe bat, the typical species associated with this habitat, is in favourable conservation status. Future prospects are good and, overall, this habitat is considered to be in good status.
3.1.02 Method used	In the absence of more accurate data, each of the 50 caves used by lesser horseshoe bats has been given a nominal area of 100m2. 22 of these fall within the SAC network. Hence the area of habitat within the network is calculated as 0.0022km2.
3.2 Conservation measures	Where lesser horseshoe bat caves occur in areas of woodland, sympathetic management practices are important to retain the value of the habitat for bats e.g. clearance of trees or other vegetation immediately around a cave entrance can reduce the suitability of the sites for bats. As well as having SACs designated for their protection, lesser horseshoe bats are strictly protected under Article 12 of the Habitats Directive wherever they occur in Ireland.

Caves (8310)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
18-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 8330

NAME: Submerged or partially submerged sea caves

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2003-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published

Barron et al. (2011). National survey and assessment of the conservation status of Irish sea cliffs. Irish Wildlife Series. No. 53. 163 pp.

CMRC (2006-12). Marine Irish Digital Atlas. http://mida.ucc.ie/.

DCENR. (2013). Spatial data for seismic surveys and Hydrocarbon Wells. http://www.dcenr.gov.ie/Spatial+Data/Petroleum+Affairs/PAD+Spatial+Data+Downloads.htm.

DCENR. (2003). Coast of Ireland, 2003 Oblique Imagery Survey Viewer. http://www.coastalhelicopterview.ie/.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

MERC. (2010). Irish Sea Reef Survey. A report to the National Parks & Wildlife Service. 32 pp.

MERC. (2012). Survey of Irish Sea Caves. A report to the National Parks & Wildlife Service. 43 pp.

NPWS. (2010). A desk study of intertidal sea caves. Unpublished Report.

NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	12600	
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	12600
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is

	no evidence of a decline since the Directive came into force and it is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.4 Area covered by Habitat

2.4.1 Surface area (km²)			
2.4.2 Year or period	2003-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	
	operator	N/A
	unknown	No
	method	Although the current Area is considered to be unknown, due to difficulties associated with surveying the extent of this habitat, there is no evidence of any decline in Area since the Directive came into force and the current Area is likely to encompass all geographical and ecological variation.
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
scubadiving, snorkelling (G01.07)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.5.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
scubadiving, snorkelling (G01.07)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.7.1 Species

Alcyonium digitatum

Aspersa conchilega

Botrylloides leachi

Botryllus schlosseri

Bugula flabellate

Caryophyllia smithii

Cerianthus lloydii

Clathrina coriacea

Cliona celata

Corynactis viridis

Crisiidae spp.

Dendrodoa grossularia

Dercitus bucklandi

Echinus esculentus

Haliclona viscose

Holothuria forskali

Obelia geniculata

Ophiactis balli

Pachymatisma johnstonia

Palaemon serratus

Peachia cylindrical

Sargartia elegans

Spirorbidae sp

Stelligera rigida

Thymosia guernei

Urticina felina

2.7.2 Species method used	Surveys of Sea Caves have been completed using SCUBA techniques. The prevalence of species within the caves was assigned a score from Abundant to Rare. The species list was generated from the frequently and abundantly reported fauna and flora.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	A total count of 1437 evident Sea Caves was used to generate an estimation of the resource but it is not possible to extrapolate an area or favourable reference area using this data or method. However as there is no evidence of a decline in the resource Area is assessed as favourable. 493 of 1437 Sea Caves are in the SAC Network.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.8.2 Area	assessment	Favourable (FV)
	qualifiers	N/A
2.8.3 Specific structures and functions (incl Species)	assessment	Favourable (FV)
	qualifiers	N/A
2.8.4 Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.8.5 Overall assessment of Conservation Status	Favourable (FV)	
2.8.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	max
3.1.2 Method used	Absent data (0)	
3.1.3. Trend of surface area	stable (0)	

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Inside	Maintain
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative	high importance (H)	Inside	Maintain

Field label	Note
Habitat code: 8330	
0.2 Habitat code	Submerged or partially submerged Seacaves vary from being small to large caverns 50 – 100m in width. Caves usually occur on cliff faces with entrances extending above the surface of the sea but a number of caves are known to be completely under water and form tunnels or caverns some of which may have both underwater openings and small surface openings e.g. An Pol bPéist, Inis Mór, Co. Galway. The primary formation method is through the erosion of rock faces. Differences in density or geological composition of the cliff face are subject to different rates of erosion by the action of compression by water or air trapped against the face by swell waves. The force of storm waves, generating several tonnes of pressure, continues to undermine weaknesses across the cliff face and can extend erosion until rock is no longer supported from beneath and falls into the sea. In stratified rock this can considerably deepen and widen a cave away from the cliff margin. The occurrence of sandstone/limestone geology is highly correlated with the formation of Seacaves with this bedrock accounting for nearly 85% of documented occurrences around Ireland. Seacaves found in areas of limestone rock may also have another formation process. The movement and corrosive action of rain water can result in a chemical decomposition as it drains from the surface bedrock downwards through fissures. This corrosion can widen and deepen narrow cracks over a long period of time and when these disparate sources coalesce they frequently form underground rivers that erode submerged caves or caverns that may terminate directly to the sea. Caves formed through this method are known to extend up to 1.5 km away from the coast and are mainly freshwater habitats e.g. the Green Holes System, Doolin, Co. Clare. The combination of both effects is likely to be active in areas where Seacaves are most frequently occurring along the Irish Coast. As closely correlated as the local geology is with Seacaves it is evident that in areas where the coastal margin is composed of less favourable or stable material caves do not appear to occur. The north shore of Galway Bay is dominated by granite and appears to have no Seacaves and large areas of the eastern Wexford coast appear mainly composed of loosely aggregated glacial deposits and may be too unstable to support caves. The floor of caves vary from sediment to bedrock and or boulders. Frequently the sides of caves are devoid of fauna close to the floor due to sediment or boulder scour. Where scour is intense the cave may have very limited fauna. The typical species of Seacaves in Ireland are known for only a couple of locations but have been found to be dominated by Alcyonium digitatum, Aspersa conchilega, Botrylloides leachi, Botryllus schlosseri, Bugula flabellate, Caryophyllia smithii, Cerianthus lloydii, Clathrina coriacea, Cliona celata, Corynactis viridis, Crisiidae sp., Dendrodoa grossularia, Dercitus bucklandi, Echinus esculentus, Haliclona viscose, Holothuria forskali, Obelia geniculata, Ophiactis balli, Pachymatisma johnstonia, Palaemon serratus, Peachia cylindrical, Sargartia elegans, Spirorbidae sp., Stelligera rigida, Thymosia guernei, and Urticina felina. The outer margins of open Seacaves are likely to be highly similar to exposed intertidal and subtidal reef communities. Where a bank of boulders is present at the back of a cave and the area is not continually submerged it may be used as a haul out area by grey seals.
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.

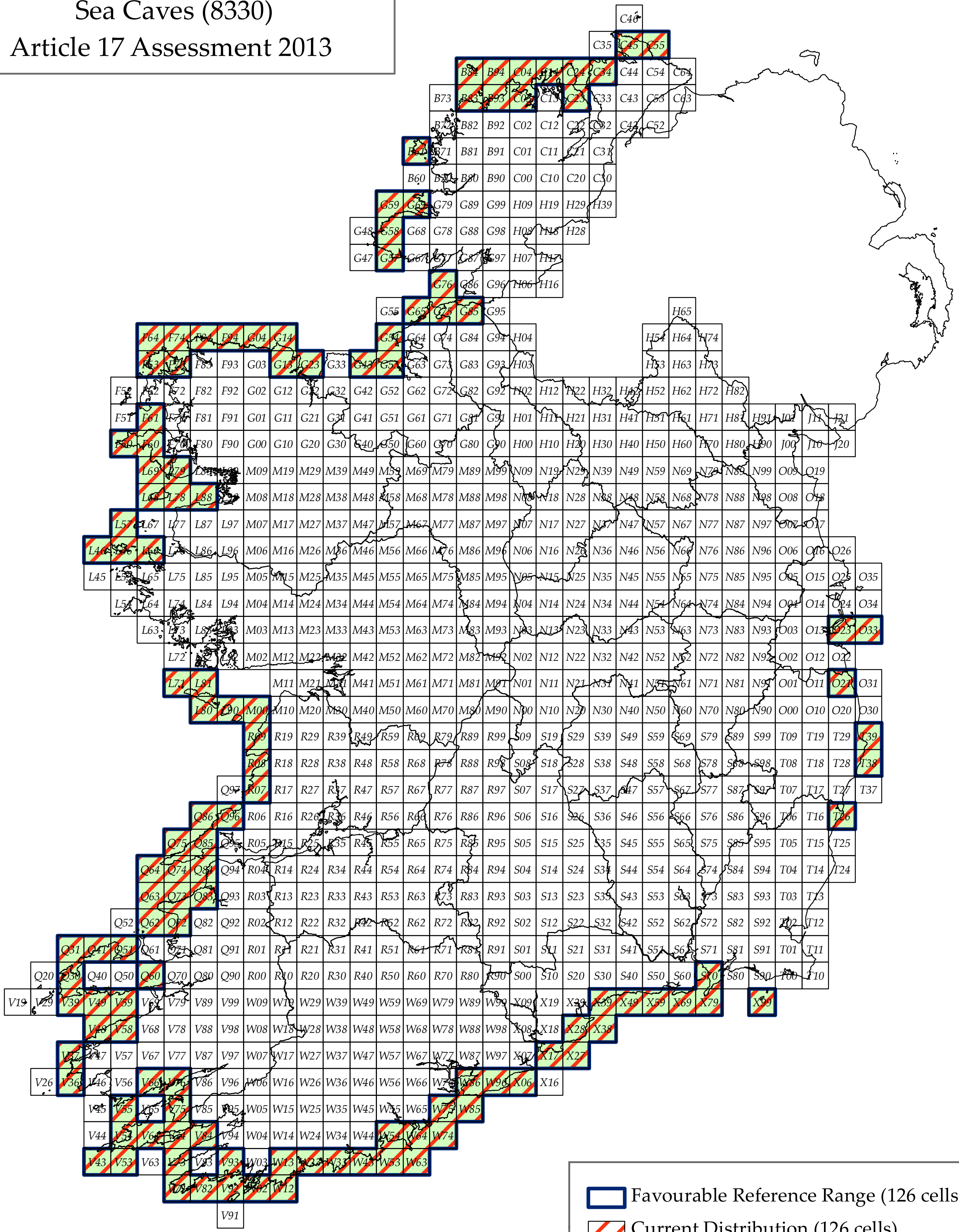
Field label	Note
Habitat code: 8330	
1.1.02 Method used - map	The primary source of data in relation to Seacaves in Ireland was the 2003 oblique aerial survey of the coast of Ireland completed by DCENR. This data set was compiled to identify areas of coastal erosion but since it used a stable helicopter platform and came close to the coastal topography it also identified Sea Cave habitat particularly around the margins of cliffs. These data do not identify sub-tidal caves.
1.1.05 Range map	The Range Map for this habitat is the intersection of the point data generated through the mapping of the habitat feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.02 Method used - Range	The Range Map for this habitat is the intersection of the point data generated through the mapping of the habitat feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence of a significant loss to the range of this habitat feature in Ireland.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of the habitat between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change of range in Sea Cave habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence (see Reasons for Change).
2.3.10 c) Reason for change - use of different method	The change in the Range of Sea Cave habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. The Range reported in 2007 was calculated as 12,700 km2 (127 x 100 km2) and in 2012 this figure is 12,600 km2 (126 x 100 km2). This slight difference may be explained by the reliance on expert opinion in 2006. There is a higher degree of confidence in the figure generated in this round of reporting as the count of Seacaves is based on photographic incidence nationally. It should be reiterated that this estimate does not include sub-tidal caves as there are few records and some anecdotal information (but they do apparently agree with this data set).
2.4.01 Surface area	Not available. A count of the evident Sea Cave habitat in Ireland (1437 caves) is provided instead of an area estimation. This is likely to be an underestimation of the total resource as it does not account for subtidal Seacaves. It will remain challenging in the future to map or generate an area for Seacaves given the significant difficulties in accessing these locations (being at the base of wind and tidally swept sea cliffs predominantly) and the incumbent health and safety issues.
2.4.03 Method used - Area covered by habitat	GIS mapping of Sea Cave was achieved using the 2003 oblique aerial survey of the coast of Ireland completed by DCENR. This data set was compiled to identify areas of coastal erosion but since it used a stable helicopter platform and came close to the coastal topography it also identified Sea Cave habitat particularly around the margins of cliffs. These data do not identify sub-tidal caves. A total count of 1437 evident Seacaves was used to generate an estimation of the resource but it is not possible to extrapolate an area or favourable reference area using this data or method.
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	There is no evidence of significant loss to the area of this habitat feature in Ireland.

Field label	Note
Habitat code: 8330	
2.4.12 c) Favourable reference area - If Favourable Reference Range is unknown, indicate with 'x'	See 2.4.3
2.4.13 a) Reason for change - genuine change?	No- there has been no significant change in the distribution of the habitat between reporting periods.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	Yes- The data available in this round of reporting is a significant improvement on that available during the last round of reporting. See 2.3.10.
2.4.13 c) Reason for change - use of different method	Yes. The current estimate of Sea Cave incidence is based on a direct count of this habitat feature.
2.5.01 Method used - pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.6.01 Method used - Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats.
2.7.02 Typical species - method used	Surveys of Seacaves have completed using SCUBA techniques. The prevalence of species within the caves was assigned a score from Abundant to Rare. The species list was generated from the frequently and abundantly reported fauna and flora.

Field label	Note
Habitat code: 8330	
2.7.04 Structure and functions - Methods used	The evaluation of the status of Structure & Function utilised the prevalence of pressures to identify potential interactions across the habitat resource. Although some data has been collected in Seacaves the majority of the evaluation of this habitat is reliant on expert judgement. The Guidance provided by the Commission was used to align the report to the appropriate assignation. A national resource that has Structures and functions (including typical species) in good condition and no significant (or known) deteriorations/pressures should be judged “Favourable”, any combination below a threshold of 25% of the resource should be judged “Unfavourable – Inadequate”, and noted values above this threshold that are unfavourable as regards specific structures and functions (including typical species) are “Unfavourable – Bad”.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this habitat is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of this habitat is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The structure and function of this habitat is judged Favourable because although a small range of episodic pressures are operating at a small proportion of the resource. It is likely that if a more resolved and complete spatial dataset and typical species profile was available it would be possible to more accurately model the interaction of pressures on Sea Cave habitat.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	Not applicable because the Structure and Function is judged favourable
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for Seacaves Annex I habitat was judged to be good although greater clarity concerning typical species will undoubtedly provide further confidence. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the number of these habitats outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices operating to manage the marine environment may be delivered through the Marine Strategy Framework Directive.
2.8.05 Overall assessment of Conservation Status	Since there are four Favourable results in Range, Area, Structure & Function, and Future Prospects the overall conclusion is the habitat is currently “Favourable”.
3.1.01 a) Surface area - Minimum	0 or Unknown as it is not possible to assign an area to Seacaves given the noted difficulties associated with this resource. It should be noted 493 of 1437 Seacaves are in Network.
3.1.02 Method used	A count of the evident Sea Cave habitat in Ireland is provided instead of an area estimation. This is likely to be an underestimation of the total resource (potentially both within and outside of the network) as it does not account for subtidal Seacaves. It will remain challenging in the future to map or generate an area for Seacaves given the significant difficulties in accessing these locations and the incumbent health and safety issues.

Field label	Note
Habitat code: 8330	
3.2 Conservation measures	6.3 Baseline mapping of SACs and generation of conservation objectives As part of a national programme to aid in the development of conservation objectives for Sea Cave habitat, data has been collected to characterise marine habitats. Data analysis of this information will also be used to develop site-specific conservation objectives for Seacaves in relevant Natura 2000 sites. 6.3 Introduction of European Communities (Marine Strategy Framework) Regulations 2011 This legislation will set targets for the management of a range of descriptors in the marine environment and leading towards Good Environmental Status by 2020. The ongoing development of policies and measures associated with this Directive will complement and support the aims of Natura Directives. 6.3 Introduction of European Communities (Birds and Natural Habitats) Regulations 2011 This legislation updates and underpins the transposition of the Birds and Habitats Directives into Irish law. 9.2 Completion of SEA with mitigation for development of offshore renewable energy sector Strategic environmental assessments offer the potential to identify at a high-level the likely environmental concerns associated with the development of specified activities across a geographical region and indicates at the plan level the requirements for appropriate assessments of activities that would be required in the further development of project level activities. This particular SEA is targeted at an economic sector that has the potential for a low level of interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for RBD management plans This particular SEA is focussed on water quality measures that have the potential for a level of spatial interaction with this habitat type particularly in the identified Coastal Waters that often include Sea Cave habitat and integrates the requirements of the Habitats Directive into the plan. 9.2 Completion of SEA with mitigation for fisheries and aquaculture sector This SEA addressed to the Fisheries and Aquaculture industry that has the potential for a low level of spatial interaction with this habitat type and integrates the requirements of the Habitats Directive into the plan.

Submerged or Partially Submerged Sea Caves (8330)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
07-06-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 91A0

NAME: Old sessile oak woods with Ilex and Blechnum in the British Isles

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2000-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published:

Barron, S.J. & Perrin, P.M. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report submitted to National Parks & Wildlife Service, Dublin.

Browne, A., Dunne, F. & Roche, N. (2000) A survey of broadleaf woodland in three SACs: Barrow-Nore, River Unshin and Lough Forbes. Unpublished report submitted to National Parks & Wildlife Service, Dublin.

Carden, R.F., Carlin, C.M., Marnell, F., McElholm, D., Hetherington, J. and Gammell, M.P. (2010) Distribution and range expansion of deer in Ireland. Mammal Review 2010.

Crushell, P. & Foss, P. (2008) The County Clare wetlands survey. Report for Clare County Council, Clare Biodiversity Forum and The Heritage Council.

Daly, O.H. & Perrin, P.M. (2010) The ancient and long-established woodlands of County Cork. Unpublished report for the Heritage Council.

O'Neill, F.H. & Barron, S.J. (2013) Results of a two-year monitoring survey of Annex I Old sessile oak woods (91A0) and Alluvial forests (91E0) in Ireland. Irish Wildlife Manuals, No. 71. National Parks & Wildlife Service, 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 & Wildlife Service, Dublin.

Perrin, P. & Martin, J. (2007) Annex I assessment of Old Sessile Oak Woods, Alluvial forests and Taxus baccata woods. Unpublished report submitted to National Parks & Wildlife Service, Dublin.

Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. (2008) National survey of native woodlands 2003-2008. Unpublished report submitted to National Parks & Wildlife Service, Dublin.

Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2010) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 1.0. Irish Wildlife Manuals, No. 48. National Parks & Wildlife Service, Dublin.

Purser, P., Wilson, F. & Carden, R. (2009) Deer and forestry in Ireland: a review of current status and management requirements. Report prepared for Woodlands of Ireland.

Tubridy et al. (2006) Heritage surveys of vulnerable landscapes 2006 - habitat map for Clare County Council.

van der Sleesen, S. & Poole, A. (2002). Inventory of semi-natural woodlands in the eastern part of County Offaly, Ireland: a pilot study for the national inventory of native woodlands. Unpublished report submitted to National Parks & Wildlife Service, Dublin.

Wilson, F. & Foss, P. (2011) The County Wicklow Wetland Survey. Report for Wicklow County Council and The Heritage Council.

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	39900	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	39900
	operator	N/A
	unknown	No
	method	In the previous reporting period, the favourable reference area (FRA) for 91A0 area km2 habitat was set at 1% of the favourable reference range. The same model is beingfollowed for this reporting period. The FRA for 91A0 habitat in Ireland is therefore much greater than its current surface area. Peterken (2002: cited in Perrin et al. (2008)) suggests that large woods should be maintained above 25ha, with smaller woods being at least 3ha, and the FRA given would permit one large woodland and several smaller woodlands within each 10km square. The high rate of fragmentation of the resource is cause for concern and, as well as area increases, greater connectivity needs to be established between individual pockets of woodland to decrease their isolation and increase gene and species flow between blocks.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	58.61		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	increase (+)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	399	
	operator	N/A	
	unknown	No	
	method	In the previous reporting period the favourable reference area (FRA) was set at 1% of the favourable reference range. This model is being followed in this reporting period. The FRA is therefore 399 sq. km. The habitat is highly fragmented in Ireland. There are many	

	examples of small parcels of woodland which lack the structural diversity that a larger expanse of woodland would have. Fragmented woodlands may be too small to support woodland specialist species due to edge effects, or they may cease to persist because of problems related to new genetic diversity coming into the ecosystem from other woodland parcels due to excessive distances between woodland blocks that cannot be bridged by natural means of dispersal.
2.4.13 Reason for change	Genuine Improved knowledge/more accurate data Use of different method

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
grazing in forests/ woodland (B06)	high importance (H)	Nitrogen input (N)
problematic native species (I02)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
grazing in forests/ woodland (B06)	high importance (H)	Nitrogen input (N)
problematic native species (I02)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Quercus petraea
Quercus x rosacea
Betula pubescens
Corylus avellana
Ilex aquifolium
Sorbus aucuparia
Lonicera periclymenum
Vaccinium myrtillus
Blechnum spicant
Luzula sylvatica
Oxalis acetosella
Hyacinthoides non-scripta
Polypodium species
Dicranum scoparium

Diplophyllum albicans

Hylocomium brevirostre

Mnium hornum

Plagiothecium undulatum

Polytrichastrum formosum

Pseudotaxiphyllum elegans

Rhytidiadelphus loreus

Saccogyna viticulosa

Scapania gracilis

2.7.2 Species method used	Monitoring surveys were carried out in 2011-2012 to assess structure & functions in monitoring plots within Annex I woodlands. Assessment was on the basis of the presence of at least 7 of the species listed in 2.7.1, which lists the selection of species that were deemed to provide the best indication of whether or not 91A0 woodland was present. Quercus petraea/Q. x rosacea + 6 species from this list, at least 2 of which had to be bryophytes, had to be present in the monitoring plot for it to pass the "Typical species present" criterion of the structure & functions assessment.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	See O'Neill & Barron (2012) for full list of structure & functions criteria assessed. Features of the canopy, shrub, field and ground layers were assessed, including minimum/maximum thresholds for %cover within a 20m x 20m plot; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of Quercus petraea/Q. x rosacea and other native tree species; tree trunk size distribution; occurrence of large dead wood. The area of 91A0 that occurs within SACs is given as 38.99. However the area of 91A0 within SACs where 91A0 is listed as a Qualifying Interest is lower, a 36.24 sq. km.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Bad (U2) qualifiers improving (+)
2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers improving (+)
2.8.4 Future prospects	assessment Bad (U2) qualifiers improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	improving (+)

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	38.99	max	38.99
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	increase (+)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving forest habitats (3.1)	Recurrent One-off	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance Long term
Measures needed, but not implemented (1.2)	Recurrent One-off	medium importance (M)	Both	Unknown

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 91A0	
0.1 Member State	Ireland
0.2 Habitat code	91A0 Old sessile oak woods habitat is defined in the interpretation manual of EU habitats as "acidophilous Quercus petraea woods, with low, low-branched, trees, with many ferns, mosses, lichens and evergreen bushes." Just 3 indicative species are listed: Quercus petraea, Ilex aquifolium and Blechnum ssp. (sic). The interpretation of this habitat to produce the assessment reported on here is wider in that it also includes woods with Quercus x rosacea (hybrid between Q. petraea and Q. robur) and locally Quercus robur. Exact specifications for the habitat definition used is given in Perrin & Martin (2007) and O'Neill & Barron (2013). Effectively, it includes all three sub-associations of the Blechno-Quercetum petraeae association.
1.1.02 Method used - map	The distribution is based on field surveys carried out between 2003 and 2007 for the National Survey of Native Woodlands (Perrin et al. 2008) as well as a monitoring survey carried out between 2011 and 2012 (O'Neill & Barron 2013). Some additional relevé data were gathered in the pilot study for the NSNW (primarily van der Sleesen & Poole 2002, Browne et al. 2000). Additional sources were consulted to produce as accurate a distribution map as possible of known 91A0 habitat; these are all listed in 2.2 Published sources.
1.1.03 Year or period	Most of the data on which the assessment is based are from field surveys carried out between 2003 and 2007 for the National Survey of Native Woodlands (Perrin et al., 2008) and the monitoring survey carried out between 2011 and 2012 (O'Neill & Barron, 2013). Some external data were incorporated from the pilot study for the NSNW (van der Sleesen & Poole 2002, Browne et al. 2000) and from a number of other sources (listed in 2.2 Published sources), including SAC GIS shapefiles and site synopses from NPWS, some of which date back to 1997, but most of the additional sources were dated 2006-2012.
1.1.04 Additional distribution map	A distribution map was derived by intersecting the sources outlined in 1.1.2 with the Irish National 10 km2 Grid.
1.1.05 Range map	The range map was derived from the distribution map referred to in 1.1.4 using the Range tool.

Field label	Note
Habitat code: 91A0	
2.2 Published sources	A comprehensive national survey of native woodlands (NSNW) was carried out in Ireland between 2003 and 2007 (Perrin et al. 2008). The final report included guidelines for the assessment of Annex I woodland sites; these guidelines were used in the monitoring survey carried out on 61 sessile oakwood sites between 2011 and 2012 (reported in O'Neill & Barron 2013). Perrin & Martin (2007) drew up criteria for determining the Annex I status of woodland relevés; these criteria were used to retrospectively determine the Annex I status of all NSNW relevés. O'Neill et al. (2010) subsequently digitised hand-drawn maps produced during the NSNW (because Annex I assessment and mapping were not within the remit of the NSNW) and extrapolated Annex I status from relevés to polygon level using a combination of information from the hand-drawn maps, aerial photograph interpretation and information from the ecologists who surveyed the sites. The additional published sources primarily refer to datasets consulted in the compilation of the distribution map and which contributed supplementary polygons not identified in the original NSNW. Additional information was obtained from detailed surveys of long-term monitoring plots within the Killarney National Park, which contains the single largest area of sessile oak woodland in the country. Additional sources NPWS (2009) Site inspection reports (1998-2009). Unpublished data. National Parks & Wildlife Service, Dublin. http://www.coillte.ie/coillteforest/environment/nature_conservation/life_nature_projects/ Mount Brandon Habitats.shp from 1602_NSUH09_11_12\Approved GIS data 2011 Survey MSE_Habitats_GIS_Approved.shp from 1602_NSUH09_11_12\Approved GIS data 2010 Survey NHA site synopses and boundary shapefiles from NPWS.ie SAC site synopses and boundary shapefile IG_SACs_NTv2_QI_Hab (incorporating Qualifying Interest information) from NPWS.ie Cross, J. (2012) River Blackwater (Cork/Waterford) SAC (site code 2170) Conservation objectives supporting document- woodland habitats. Cross, J. (2011) River Barrow and River Nore SAC (site code 2162) Conservation objectives supporting document- woodland habitats. NPWS-Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012.shp) Glenveagh National Park habitats shapefile (project ID 2507_GNPH98) South Clare Habitat Map prepared by RPS Group (2008) Dun Laoghaire_Rathdown Co. Council: Data from Compass Informatics Wicklow upland habitats map: RAW Consulting 2007
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	The extensive survey work on which most of the publications listed in 2.2 were based led to the production of a 91A0 distribution map, which was used as the basis for the range map created using the range tool. (See also note 2.4.1 below.)
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence that the climatic and edaphic factors that determine the range of this Annex I habitat have changed in the last 12 years, as areas of the habitat throughout its range have been visited during this period of time. Therefore the range is stable.

Field label	Note
Habitat code: 91A0	
2.3.09 b) Favourable reference range - Indicate if operators were used	The favourable reference range is approximately the same as the range area given in 2.3.1, i.e. 39800 sq. km.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Range calculated for 2001-2006 reporting period was estimated, based on an incomplete survey (NSNW finished in 2007). Range calculated for the current reporting period is based on a full nationwide survey, together with follow-up surveys of some of those sites during the 2011-12 monitoring survey.
2.3.10 c) Reason for change - use of different method	Range tool rather than a manual method was used to determine the range in this reporting period.
2.4.01 Surface area	Surface area is primarily based on comprehensive field surveys carried out for the national survey of native woodlands (NSNW) between 2003 and 2007 and mapped post hoc in 2010. Additional areas were mapped from a range of other sources, such as surveys carried out on behalf of county councils or NPWS (all listed under 2.2 Published sources). For polygons that originated from the NSNW, some are mapped as pure 91A0 stands (31.90 sq km) while others are mapped as mosaics of 91A0 and non-91A0 (10.82 sq km). For the purposes of area calculation, these mosaics are included in the total area as though they were pure 91A0 stands; thus the total area of [91A0+other woodland habitat] mosaic represents the highest possible value of 91A0 in these mosaics. An additional 15.99 sq km of 91A0 was added from other sources such as NPWS and county council surveys. The total area of 58.61 sq km should be regarded as the minimum area of 91A0 within the country, as there are likely to be other pockets of 91A0 woodland that were not surveyed or whose Annex I status was not determined during the NSNW.
2.4.02 Year or period	Field surveys for the NSNW were carried out between 2003 and 2007 (Perrin et al. 2008), with follow-up surveys in 2011-2012 (O'Neill & Barron 2013). Other 91A0 sites were identified during the pilot survey for the NSNW, carried out in 2001 (van der Sleesen & Poole 2002), and during a survey by Browne et al. (2000). Other sites were included from a range of other sources, mostly dated 2006-2012, including monitoring sites in Killarney and Wicklow National Parks..
2.4.03 Method used - Area covered by habitat	The reported area is based on comprehensive nationwide field surveys and supplementary data sources outlined in 2.2 Published sources, and is the absolute minimum of this habitat in Ireland. Additional areas may also occur that were not surveyed or were not reported on in any of the data sources
2.4.04 Short-term trend - Period	Short-term period is 2000-2012, based on the survey dates of the main data sources used to complete this assessment.

Field label	Note
Habitat code: 91A0	
2.4.05 Short-term trend - Trend direction	Short-term trend direction has been gauged based on examination of 61 sites surveyed between 2011 and 2012 and comparison with their area in aerial photographs from 2000; information from other forestry bodies, e.g. Coillte, Forest Service, was also taken into account. Most of the 61 sites remained stable in area, with small gains in area identified in two sites, possibly due to removal of conifers from existing mixed woodlands. Extensive planting of broadleaf woodland has also taken place in the last 12 years, through the People's Millennium Forest initiative and Native Woodland Scheme. Gains are also occurring from the expansion of existing woodlands through native planting and from rehabilitation of mixed conifer/acid oak woodland through the selective removal of conifers or invasive species. The glades created by such management are in many cases undergoing natural succession by birch (and oak) recolonisation on partially cleared areas. Similar changes are expected to take place in clearfelled parcels of conifer forest situated adjacent to Annex I sessile oak woodland.While these will not yet be classed as true gains due to the length of time it takes for Annex I old sessile oak woodland to develop, the expectation is that the trend will continue upwards. In 91A0 areas that have been rehabilitated by removal of non-natives, though the actual area of 91A0 may not have increased, the result is better quality 91A0 woodland.
2.4.07 Short-term trend - Method used	As noted above in note 2.4.5, short-term trend direction has been gauged based on examination of 61 Annex I oak wood sites surveyed between 2011 and 2012, a subset of the national resource, and on information from other forestry bodies. The current areas of the sites (from 2012 field maps) were compared with their area on aerial photographs dated 2000. The area of the majority of the sites remained stable but there were nett gains overall (one site experienced a slight area loss but two experienced gains), which amounted to 0.1% of the total area of woodland assessed. These have been complemented by gains due to rehabilitation of forest habitat elsewhere in the country, such as in the Vale of Clara. While the main effect of such rehabilitation is the improvement of structure and functions, some area increases have been achieved through new plantings (though not yet of Annex I quality). Exact figures for recent area changes (whether losses or gains) of sessile oak woodlands that were not surveyed recently could not be determined due to the lack of up-to-date aerial photographs. However, on the basis of the data available, area trend has been determined to be + increasing.
2.4.12 a) Favourable reference area - In km2	In the previous reporting period, the favourable reference area (FRA) for 91A0 habitat was set at 1% of the favourable reference range. The same model is being followed for this reporting period. The FRA for 91A0 habitat in Ireland is therefore much greater than its current surface area. Peterken (2002: cited in Perrin et al. (2008)) suggests that large woods should be maintained above 25ha, with smaller woods being at least 3ha, and the FRA given would permit one large woodland and several smaller woodlands within each 10km square. The high rate of fragmentation of the resource is cause for concern and, as well as area increases, greater connectivity needs to be established between individual pockets of woodland to decrease their isolation and increase gene and species flow between blocks.

Field label	Note
Habitat code: 91A0	
2.4.13 a) Reason for change - genuine change?	Slight gains in area have occurred in recent years, for example in the Vale of Clara and Glengarriff, due to planting and habitat restoration through the removal of non-native species such as Rhododendron ponticum and conifers. However, the main reason for the difference in the surface area given in the two reporting periods is more accurate data, significantly incorporating a large area in Killarney National Park that had not been mapped prior to the previous reporting period. Genuine gains are likely to have been in the order of hectares rather than square kilometres.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The figure given here for surface area of 91A0 is based on a full national survey, supplemented with additional data sources from miscellaneous surveys throughout the country. The lower figure for area given in the last reporting cycle was based on an incomplete survey in which some sites had not yet been ground-truthed, and which did not include much of the area mapped in Killarney National Park in 2011 – this alone measured approximately 10 sq. km. As noted in 2.4.1 above, the figure given for surface area represents the minimum area of 91A0 habitat in Ireland; the actual figure is likely to be higher.

Habitat code: 91A0

Field label	Note
2.5 Main pressures	See Note for "2.5.1 Methods used – Pressures" for how rankings were decided. I01 Invasive non-native species have a high incidence and impact a large area of 91A0 habitat nationwide. Invasive species were noted in three SIR reports, and were the main negative impact on 91A0 habitat noted during the WMS (46 out of 61 sites; 14 high intensity, 7 instances affect >50% of the site; 16 medium intensity, 5 affecting >50% of the site; 16 low intensity, 3 affecting >50% of the site). The most important species are the shrub Rhododendron ponticum, and the trees Fagus sylvatica, Acer pseudoplatanus and several conifer species, seedlings and saplings of which were frequently recorded. B06 Grazing indicated here is overgrazing, usually by deer but sometimes cattle and more rarely sheep or goats, which impacts on regeneration success and also causes nutrient enrichment through dunging (pollution qualifier ticked on report). Both the frequency and area of affected sites are high. Overgrazing was noted at 19 of the 61 oak woodland sites monitored during the WMS (11 high intensity, all recorded in >50% of the site; 8 medium intensity, 8 affecting >50% of the site; 21 low intensity, 14 affecting >50% of the site). Six SIR reports noted grazing as a problem in 91A0 habitat, with an additional note on stock feeding having a negative effect. Recent reports on deer populations in Ireland suggest that deer grazing in particular will become even more of a problem in the future (Purser et al. 2009; Carden et al. 2010). Pollution qualifier: The reporting form makes it possible to add a pollution qualifier to an impact. For overgrazing the pollution qualifier "N" has been added to signify that nitrate pollution is an additional possibility when overgrazing occurs. Fertiliser drift from adjacent agricultural land may also impact on some sites. I02 Problematic native species are usually associated with undergrazing; brambles are the species most cited as being problematic. The evidence of this impact comes from the WMS, where it was noted at 9 of the 61 sites surveyed (3 high intensity, all affecting >50% of the site; 5 medium intensity, 3 affecting > 50% of the site; 2 low intensity, 1 affecting 50% of the site). Note that, although H05.01 (code used for dumping, including fly-tipping) is given with a Low ranking, its frequency is high; however, its ecological impact on the overall 91A0 habitat is deemed to be low as only small areas, generally at the edges of woodlands, were being affected. In the WMS, 14 of the 61 sites of 91A0 suffered from negative dumping, and it was also listed as a negative impact in one SIR report. Other pressures that have not been listed but operate at a local level or on a small scale include: B02.02 Forestry clearance (one WMS site, where the negative effects were mostly edge effects and opening up of seed beds for invasive species, and one SIR report – reason unknown; it is not regarded as being of significance due to its low incidence and small area affected); G05.09 Fences, fencing (occasional problems where grazers become fenced in and overgraze an area); G01.02 Walking, horse-riding and non-motorised vehicles (slight trampling effects); B02.03 Removal of forest undergrowth. SIR reports indicate other occasional impacts: paths/tracks/cycling tracks, sand & gravel extraction (quarries), cultivation (modification of cultivation practices), dumping/ depositing of dredged deposits, landfill/land reclamation & drying out (general), and scrub removal

Field label	Note
Habitat code: 91A0	
2.5.01 Method used - pressures	Actual impact data from the monitoring survey of 2011-12 have been used in this assessment. SIR data on impacts noted in protected areas by NPWS rangers have also been incorporated. High impact pressures with a high incidence were given a ranking of High. Medium impact pressures (e.g. problematic native species) with a medium incidence were given a Medium ranking. High impact pressures with a medium to low incidence were given a ranking of Low. Low impact pressures with a high incidence were given a ranking of Low. Impacts that were recorded in a very small number of sites (<3, including SIR data) were not
2.6 Main threats	This is derived from the pressures operating on the habitat during the reporting period. There is no impending legislation and no projected changes to indicate that any of the pressures listed in 2.5 will become either more or less severe than in the last 12 years. However, recent reports on deer populations in Ireland suggest that deer grazing in particular (already listed as a current high impact pressure) will become even more of a problem in the future (Purser et al. 2009; Carden et al. 2010).The current economic climate has led to an increase in unregulated felling for fire wood which may impact negatively on the habitat.
2.7 Complementary information	The list of indicator species used in WMS 2011-2012 is presented and their assessment is explained in 2.7.2.
2.7.04 Structure and functions - Methods used	The structure and functions (S&F) assessment results from the 61 sites surveyed during the WMS were extrapolated up to a national level. Each site was assessed (using 4 monitoring plots per site) with relation to features of the canopy, shrub, field and ground layers, including minimum/maximum thresholds for %cover within a 20m x 20m plot; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of Quercus sp. and other native tree species; tree trunk size distribution; occurrence of large dead wood. Overall, S&F failed in 43% of monitored sites. Criteria such as positive indicator species, canopy height, canopy cover, proportion of Quercus sp. in canopy, and native field layer cover all generally performed well across the majority (>80%) of monitoring plots. However, problems with invasive and non-native species were frequent, causing 47% of monitoring plots to fail due to the presence of negative species regeneration (seedlings or saplings of non-native and invasive species) and 26% of plots to fail due to high (>10%) cover of negative species. Grazing pressure was also identified as a problem in 31% of monitoring plots, and this impact has an effect on the success of Quercus regeneration, with 39% of sites recorded as having no Quercus regeneration at the sapling stage. These factors, in combination with the high failure rate (43%) of S&F across the monitoring sites, result in a S&F assessment of U2-Bad for 91A0 woodlands.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	It was stated in the 2007 reporting document that the (then) current range would be taken to be the favourable reference range. The range calculated for this reporting period is used in preference to that calculated for 2000-2006 because the data used to produce the range map for this reporting period are more accurate. The current range and the favourable reference range are taken to be approximately equal, so the range assessment is Favourable.

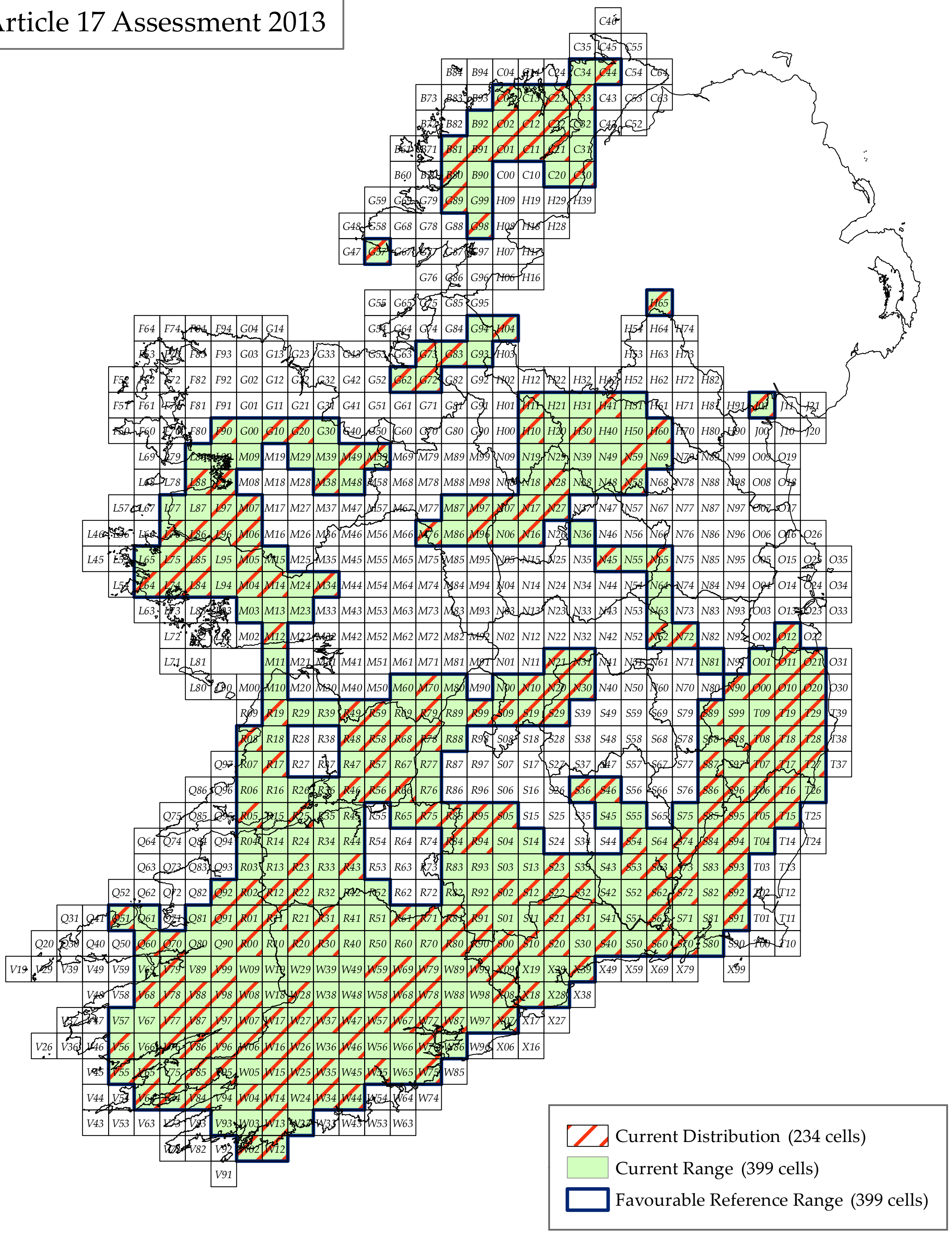
Field label	Note
Habitat code: 91A0	
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	Although area conservation assessment is U2-Bad, further large-scale losses in the habitat are not anticipated, largely as a result of the more widespread implementation of Appropriate Assessment and partly also because of the recent decrease in large-scale national infrastructure projects such as road construction. Any small-scale losses occurring should be offset by planting of native broadleaved trees that is taking place in some sites in both state and private ownership. While the main effect of such rehabilitation is the improvement of structure and functions, some area increases have been achieved through new plantings (though most are not yet of Annex I quality). The area assessment is thus expected to improve in the future as plantings continue and these newly-planted areas, particularly if they occur adjacent to existing 91A0, are expected to mature into Annex I woodland.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Area conservation assessment is evaluated as U2-Bad because the favourable reference area for 91A0 has been determined as 1% of the range and the current area of 91A0 is currently far less than this value.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Although area conservation assessment is U2-Bad, further large-scale losses in the habitat are not anticipated, largely as a result of the more widespread implementation of Appropriate Assessment and partly also because of the recent decrease in large-scale national infrastructure projects such as road construction. Any small-scale losses occurring should be offset by planting of native broadleaved trees that is taking place in some sites, mainly in state ownership but also on private land. While the main effect of such rehabilitation is the improvement of structure and functions, some area increases have been achieved through new plantings (though most are not yet of Annex I quality). The area assessment is thus expected to improve in the future as plantings continue and these newly-planted areas, particularly if they occur adjacent to existing 91A0, are expected to mature into Annex I woodland.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The thresholds used to assess the national status of structure and functions (S&F) were as follows: Failure of 0-1% of sites: Favourable status; Failure of 1-25% of sites: Unfavourable-Inadequate (U1-Inadequate); Failure of >25% of sites: Unfavourable-Bad (U2-Bad). These thresholds were used in conjunction with the examination of the nature of the failures across all sites monitored. The 61 sessile oakwood sites monitored in 2011-12 were used as a proxy for the national resource of 91A0 and the percentage of sites that received each assessment was used instead of percentage of area. The actual number of sites receiving a U2-bad assessment for S&F was 26 (43%), which is above the 25% threshold set for U2-Bad. This, in conjunction with the fact that the high-ranking pressures I02 Invasive species and B06 Grazing in forests/woodland occurred frequently within sites, results in a national assessment for S&F for 91A0 woodlands as U2-Bad.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The condition of 91A0 structure and functions nationally is improving due to the rehabilitation of large areas of woodland, such as the Vale of Clara and Glengarriff, from which conifers and invasive species are being removed and new plantings are taking place.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Future prospects are evaluated nationally as U2-Bad because the area extent of 91A0 is not expected to reach the favourable reference area within the next two reporting periods, and structure & functions are likewise unlikely to exceed the favourable reference thresholds within the next 12 years.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future prospects are improving for 91A0 woodlands due to the implementation of screening for Appropriate Assessment and restoration of some woodlands in state and semi-state ownership and natural expansion due to land abandonment.

Field label	Note
Habitat code: 91A0	
2.8.05 Overall assessment of Conservation Status	The completed national woodland survey by Perrin et al. (2008) provided more extensive distribution data on Irish Annex I sessile oak woodlands than was available for the 2007 reporting period; additional distribution information was also brought in from a number of other sources that were not available in 2007, notably the Killarney National Park habitat survey of Perrin & Barron (2011). These more accurate data resulted in new figures for Area and Range. There is no evidence of decline of the Range, so this was assessed as Favourable. However, the Favourable Reference Area is much higher than the current area due to the high degree of fragmentation of this habitat in Ireland, which precludes its long-term viability from being regarded as assured. The current area (58.61 sq. km) is only 14.7% of the FRA (398 sq. km); it was therefore assessed as Unfavourable – Bad. Structure and functions were assessed by examining habitat data such as: typical species; features of the canopy, shrub, field and ground layers; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of Quercus sp. and other native tree species; tree trunk size distribution; and occurrence of large dead wood. The main pressures operating in sessile oak woodlands were also examined. Non-native and invasive species, especially Rhododendron ponticum and Fagus sylvatica, and overgrazing, particularly by deer, were regarded as the main problems affecting Annex I sessile oak woodlands; these have negative repercussions on other structural parameters such as presence of typical species, cover of shrub, field and bryophyte layers, and regeneration of oak and other native tree species. Structure and functions and Future prospects were each assessed as Unfavourable – Bad, due to the high incidence of serious problems such as invasive species and overgrazing, together with the issue of woodland fragmentation, which can be regarded as an additional criterion affecting the condition of the resource nationally that is not at an optimum level. The overall assessment has been evaluated as Unfavourable – Bad due to the assessment of three of the four parameters (Area, Structure and Functions, and Future Prospects) as Unfavourable – Bad.
2.8.06 Overall trend in Conservation Status	There have been national efforts to remove non-native and invasive plant species and to reduce overgrazing by deer (e.g. by culling) in 91A0 woodlands; increased planting of broadleaf trees is also taking place. These measures have resulted in improvements to a number of sites and the work is on-going. Problems still remain, as invasive plant removal and control of grazers are labour-intensive processes that usually require sustained efforts and follow-up work to ensure complete removal. The lesser problem of undergrazing is becoming more prevalent (occurring where domestic stock have been completely removed, resulting in proliferation of competitive species such as brambles), although overgrazing remains more serious. However, if current levels of planting and non-native species removal are maintained, the overall condition of sessile oak woodlands will continue to improve.
3.1.01 a) Surface area - Minimum	This value is the total area of 91A0 habitat occurring within an SAC boundary, as determined by intersecting the 91A0 habitat shapefile NCADist_91E0 with the SAC shapefile IG_SACs_NTv2_QI_Hab. The total area of 91A0 habitat that is listed as a Qualifying Interest within these SACs is lower, 36.24 sq. km, as not all 91A0 recorded is a QI for the SAC within which it occurs.
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has been calculated as accurately as possible. Therefore min value = max value.

Field label	Note
Habitat code: 91A0	
3.1.02 Method used	The distribution map of 91A0 habitat was derived primarily from a nationwide survey of woodlands and also drew on additional data sources to include sites that may have been omitted from the national survey, e.g. because they did not fit the criteria of that survey. This was intersected with the SAC boundary shapefile to give the total area in sq. km of 91A0 located within SACs. As noted above, the area of 91A0 listed as a QI within SACs is lower.
3.1.03 Trend of surface area within the network	No exact data were available from the previous reporting period to gauge this trend accurately but it is considered that, even if some losses were to have occurred in parts of the network, gains recorded in some state-owned properties, e.g. the Vale of Clara and Glengarriff, should offset these. The trend is therefore set at + increase.

Field label	Note
Habitat code: 91A0	
3.2 Conservation measures	Expert judgement was used in all cases to determine rankings of conservation measures. 3.1 Restoring/improving forest habitats: Conservation measures, such as invasive species removal (e.g. Rhododendron ponticum, Prunus laurocerasus, conifers), are implemented in many sites within the Natura 2000 network, especially state-owned sites. They are also applied in some sites outside the network, but to a lesser degree, and this can depend on whether or not the woodland is state-owned or privately owned. Financial and personnel constraints are likely to be a consideration here, especially for private landowners. Where overgrazing is a problem, conservation measures are taken in some woodlands but this is costly and not necessarily effective at present. Culling of large grazers such as deer, which are the main species associated with overgrazing in sessile oak woods nationally, is carried out in some woodlands. Fencing is sometimes erected in an effort to exclude grazers but the effects can be negative if for example proliferation of brambles may result, or in other cases grazers may actually be fenced into an area, leading to overgrazing. 6.3 Legal protection of habitats and species: this measure is in place to impose legal protection on a subset of our national 91A0 resource. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow it to proceed. Each plan or project must consider the possible effects it may have in combination with other plans and projects when going through the process known as appropriate assessment. The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required. This is termed AA screening. Its purpose is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives (from "Appropriate assessment of plans & projects – Guidance for planning authorities" (2009) DoEHLG). 1.2 Measures needed but not implemented: this refers to management that should be carried out but for financial, logistical or other reasons has not been implemented, although the need for it is clear. The broad evaluation of the measure is entered as "Unknown" - if the required measures were to be implemented the effect would unquestionably be positive, and not implementing them is potentially detrimental. 6.1 Establish protected areas/sites: Some areas such as proposed NHAs have not yet been designated and they lack the level of legal protection afforded to SACs. However, they have limited protection, for example, they are recognised by planning and licensing authorities as having ecological value, and they require approval from NPWS before Forest Service afforestation grants will be paid on pNHA lands

Old Oak Woodlands (91A0)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
03-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 91D0

NAME: Bog woodland

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2005-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region — **Atlantic (ATL)**

2.2 Published

Cross, J.R. (1987). Unusual stands of birch on bogs. Irish Naturalist Journal 22: 305-310

Cross, J. and Lynn, D. (2013) Results of a monitoring survey of Annex 1 Bog Woodland (91D0). Irish Wildlife Manuals, No. 69. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. and Delaney, A. (2008). National survey of native woodlands 2003-2008. A report submitted to the National Parks and Wildlife Service.

Fernandez, F., Fanning, M., Mccorry, M. & Crowley, W. (2005). Raised Bog Monitoring Project 2004-05. Unpublished report, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Fernandez, F., MacGowan F., Crowley, W., Farrell, M., Croal, Y., Fanning, M. & McKee, A. (2006). Assessment of impacts of turf cutting on designated Raised Bogs 2003-06. Unpublished report, National Parks & Wildlife Service, Department of Environment, Heritage Local Government, Dublin.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & S, Smith G. (2013). Raised Bog Monitoring Project 2013. Irish Wildlife Manuals, No XX. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Fernandez, F. Crowley, W. & Wilson S. (2009). Clara Bog (Clara, Co. Laois) High Bog Ecological Survey, National Parks & Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

NPWS (2007). Bog Woodland Conservation Status Assessment Report. Unpublished Report, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland..

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	5700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	5700
	operator	N/A
	unknown	No
	method	The current range is set as the Favourable reference range as there is no evidence of a decline since the Directive came into force and all ecological and geographical areas are encompassed by the current range.
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method	

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	1.42		
2.4.2 Year or period	2005-2012		
2.4.3 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	increase (+)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	1.42	
	operator	N/A	
	unknown	No	
	method	Field survey evidence suggests that the area of this habitat is declining on raised bogs due to ongoing desiccation but expanding on abandoned cutaway as conditions develop that are favourable for particular sub-community types. Overall there is likely to have been a slight increase in area, however it is difficult to quantify this increase. The current area is therefore considered to represent the baseline area and is set as the Favourable reference area. This area is considered sufficient to ensure the long term viability of the habitat.	
2.4.13 Reason for change	Genuine Improved knowledge/more accurate data		

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
Peat extraction (C01.03)	medium importance (M)	N/A
human induced changes in hydraulic conditions (J02)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	low importance (L)	N/A
intensive grazing (A04.01)	low importance (L)	N/A
grazing in forests/ woodland (B06)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A

2.5.1 Method used – pressures: based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
Peat extraction (C01.03)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
burning down (J01.01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	medium importance (M)	N/A
intensive grazing (A04.01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	low importance (L)	N/A
grazing in forests/ woodland (B06)	low importance (L)	N/A

2.6.1 Method used – threats: expert opinion (1)

2.7 Complementary Information

2.7.1 Species

Pinus sylvestris
Salix aurita
Salix atrocinerea
Erica tetralix
Calluna vulgaris
Dryopteris spp.
Potentilla erecta
Carex rostrata
Juncus effusus
Molinia caerulea
Vaccinium myrtillus
Epilobium palustre
Eriophorum vaginatum
Polytrichum commune

Sphagnum fimbriatum

Sphagnum fallax

Sphagnum palustre

Sphagnum sqarrosum

Sphagnum capillifolium

Sphagnum teres

Polytrichum strictum

Hylocomium splendens

Aulacomnium palustre

Vaccinum oxycoccus

Betula pubescens

Fraxinus excelsior

2.7.2 Species method used	The species were derived from relevés taken as part of the National Survey of Native Woodland (Perrin et al 2008), Cross (1987) and the Bog Woodland Conservation Status Assessment Report (NPWS, 2007). The list was refined during the course of monitoring to exclude non-indicator species. At standardised monitoring stops (10mx10m or 20mx20m) the presence of Betula, Sphagnum spp. and 5 other species from the list were required for this indicator to reach its target.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	The definition of this habitat is not always clear-cut but if the woodland is dominated by birch and has a Sphagnum cover > 25% then it is classified as bog woodland. This includes some areas which are transitional to carr but species indicative of ground-water influence should only be minor constituents. 0.297 km2 of this habitat is listed as a qualifying interest within the SAC network. Most sites appear to be recent, i.e. they do not appear on the 'historic' 25" maps, which probably date from the early part of the 20th century. In a number of plots there was poor regeneration of birch. However, this may reflect the stand age and structure and consequent absence of suitable sites for regeneration. It is also possible that some bog woodlands, especially on cutaway, are transient communities forming a seral stage to an alternative vegetation type, e.g. open bog. However, bog woodlands associated with flushed sites on high bogs and within sessile oak woods may be semi-permanent communities as long as the relatively nutrient-rich water persists.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Favourable (FV) qualifiers N/A

2.8.3 Specific structures and functions (incl Species)	assessment Favourable (FV) qualifiers N/A
2.8.4 Future prospects	assessment Favourable (FV) qualifiers N/A
2.8.5 Overall assessment of Conservation Status	Favourable (FV)
2.8.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.457	max	0.457
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

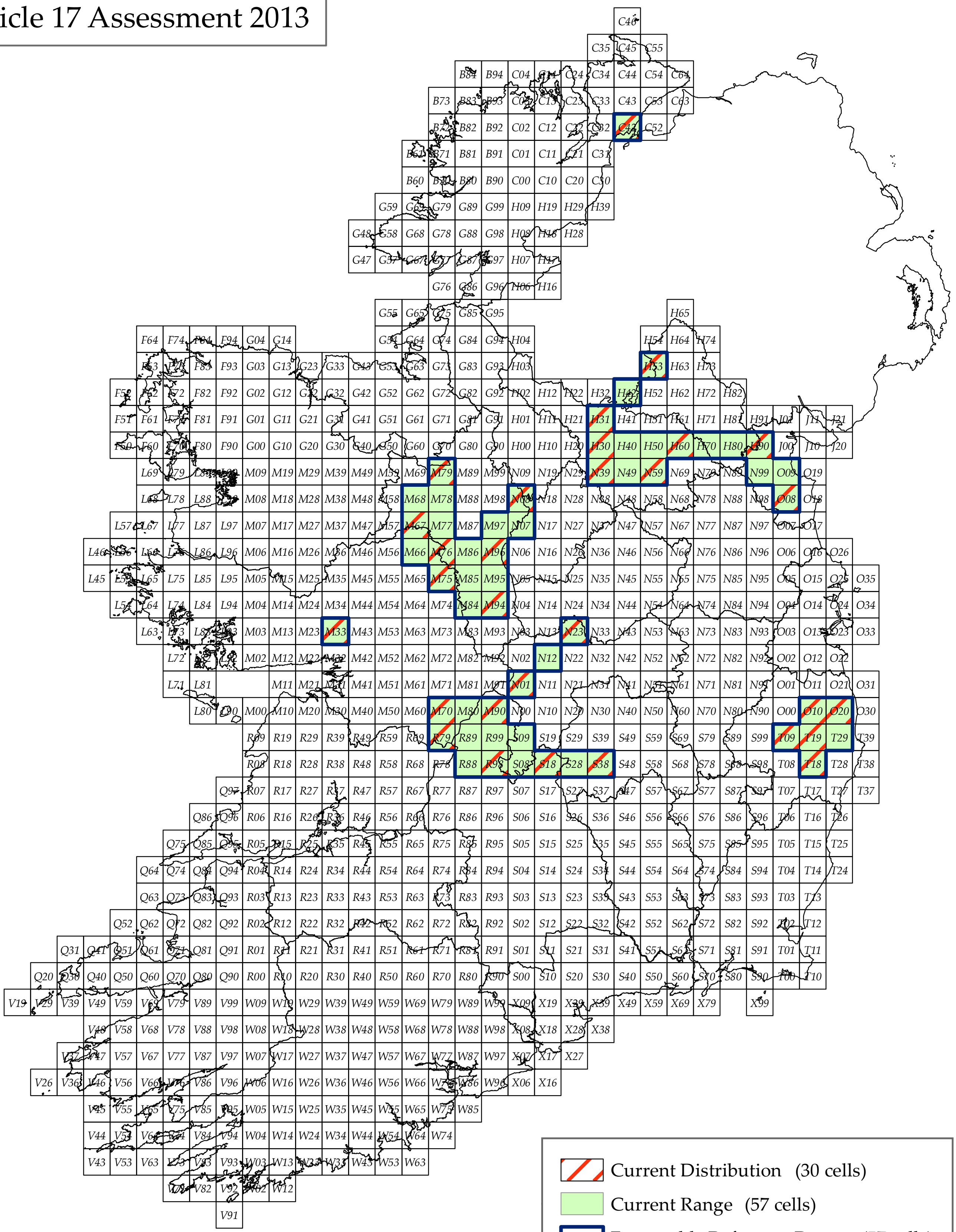
3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving the hydrological regime (4.2)	Recurrent	high importance (H)	Both	Not evaluated
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Maintain

Field label	Note
Habitat code: 91D0	
0.2 Habitat code	Bog woodland is a widespread but localised habitat type in Ireland. It occurs in 3 distinct habitats. 1) On raised bogs, where it is associated with weakly flushed sites on the high bog. 2) On cutaway bog, where it occus in association with weak ground-waterinfluence. 3) Within sessile oak woodlands in association with nutrient-poor flushes. Geographically, bog woodland is found mostly in the midlands, within the drumlin belt of the north midlands and in upland valleys. Bog woodlands are dominated by birch (Betula pubescens) with small amounts of willow (mostly Salix aurita or S. atrocinerea). Locally, there may be small amounts of Scots pine, especially on raised bogs. Generally, the field layer is poorly developed but the dwarf shrub layer may be well developed, especially on raised bogs, and the moss layer is well developed, often luxuriant and dominated by Sphagnum species.
1.1.02 Method used - map	Location data from Fernandez et al (2005; 2006; 2009; 2013), Perrin et al. (2008) and Cross & Lynn (2013) were compiled to derive the current distribution. Information from more general in house fields surveys undertaken by John Cross in 2011/2012 were also considered.
1.1.03 Year or period	2005-2013 is given as the period as this is when the publications which detail distribution data were made available. Field surveys may have occurred before these dates.
1.1.04 Additional distribution map	A distribution map was derived by intersecting the sources outline in 1.1.2. with the Irish National 10 km2 Grid.
1.1.05 Range map	The range map was derived from the distribution map referred to in 1.1.4. using the Range Tool.
2.3.02 Method used - Range	See 1.1.2 and 1.1.5.
2.3.04 Short term trend - Trend direction	Sites were visited across the range in 2011 and 2012 by Cross & Lynn (2013) and Fernandez (2013). It can be deduced from these survey that there is no evidence to suggest any change in range since 2001
2.4.01 Surface area	The polygons derived from each site were summed to give a national estimate of 142 ha. This is less than the figure given for the previous reporting period but is based on more accurate data.
2.4.02 Year or period	The area of all known Bog woodland was derived for the time frame specified in 1.1.3.
2.4.05 Short-term trend - Trend direction	Bog woodland has been recorded from 35 sites. However, new sites continue to be recorded on cutaway sites. It is probable that as peat cutting declines and increasing areas of cutaway are abandoned the number and area of bog woodlands will increase. Nonetheless, the area of individual stands will probably always be small as very specific hydrological conditions are required both for the initiation and maintenance of this habitat.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The area of bog woodland given here is based on a partial survey. Bog woodland has been recorded from over 30 sites, however new sites continue to be found while some sites previously recorded as bog woodland have been omitted because they are too small or were wrongly classified. Other sites were found to be smaller than previously thought. As the area of individual woodlands is mostly small and they typically occur within an extensive mosaic of wet and dry birch woodland on cutaway there is a strong likelihood of other sites being found. The figue given therefore represents the minimum area.

Field label	Note
Habitat code: 91D0	
2.5 Main pressures	Pressures were recorded at each site and the extent and severity assessed (Cross & Lynn (2013); Fernandez et al. (2013). The principal pressure is change in hydraulic condition arising from peat extraction and drainage leading to drying out of the bog surface. These pressures vary from site to site but tend to be greatest on bog woodlands occurring on raised bogs where fire is also a risk, particularly to the marginal vegetation. However, bog woodlands probably respond slowly to hydrological changes. There is also some evidence that while cutting and drainage may alter surface hydrology, this is not always detrimental to bog woodland, which may actually increase in area due to paludification of very wet areas and subsidence and increased wetting/flushing in other areas. Bog woodlands on cutaway and in flushed sites within sessile oak woods are under much less threat from cutting and draining. Expansion of native species - and to a lesser extent alien species - may be a threat where a raised bog is drying out. Infrastructural development is a localised pressure.
2.6 Main threats	The listed pressures are also possible threats. It is likely that with the cessation of turf cutting on the raised bogs the associated threat of drainage and fire will decline. Drain blockage should also slow down or reverse dessication but it may be many years before there is a positive impact on the bog woodlands. Bog woodlands on cutaway do not appear to be under threat and in fact appear to be relatively safe from outside influences unless there is further local or regional drainage or local infrastructural development. Bog woodland located within other woodland types is most likely to be affected by invasive non-native species and woodland management, although the pressure is slight. Locally, infrastructural projects, such as road building, may impact on sites.
2.7.04 Structure and functions - Methods used	7 bog woodland were monitored by Cross & Lynn (2013) and several additional sites were monitored by Fernandez et al (2013) during the same period as part of the monitoring of raised bogs. At each site 2-4 monitoring plots, measuring 20 x 20 (or 10 x 10 if the site was very small), were used to gather data on the structure and function. Data were collected on the following: presence of positive and negative indicator species; the height and cover of the canopy and specifically Betula pubescens; dwarf shrub layer; cover of Calluna, Sphagna and other bryophytes; size classes of target tree species; abundance of dead wood; regeneration of both target and non-target native species. A few sites were subject only to a general assessment where the above data was collected but over the whole site rather than in plots.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence of a decline in Range since the Directive came into force. Therefore Range is assessed as favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence of a decline in Area since the Directive came into force, in fact there is evidence that this habitat is expanding, therefore Area is assessed as favourable.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	The qualifier is assessed as improving as the area of bog woodland is likely to increase over time on cutaway bog.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	All sites monitored by Cross & Lynn (2013) demonstrated favourable structure and functions, therefore this attribute is assessed as favourable a the national level.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future prospects were assessed by noting the pressures, threats and impacts, both positive and negative, occurring throughout the bog woodland area as part of the field surveys (Cross and Lynn (2013), Fernandez et al (2013). 2 sites were assessed as unfavourable inadequate because of overgrazing and/or drying out but the remaining sites were assessed as favourable. Therefore Future prospects were assessed as favourable at the national level.

Field label	Note
Habitat code: 91D0	
2.8.05 Overall assessment of Conservation Status	The field surveys undertaken by Cross and Lynn (2013) and Fernandez et al. (2013) provide refined figures for Range and Area. A few sites surveyed by Fernandez et al. (2013) were considered too small to be classified as bog woodland but could form the nucleus for future expansion. Although the area is less than the previous reporting period, evidence suggests that the total refined area is likely to be increasing and that the quality in most sites is Favourable with only 2 sites assessed as Unfavourable- Inadequate. There are numerous raised bogs which harbour small flushes containing areas of birch woodland or scattered birch trees, these areas may expand in the future. Extensive areas of cutaway are being colonised by birch woodland, a proportion of which can be expected to develop into bog woodland, this may be anticipated to offset any losses. Therefore the overall assessment is Favourable.
3.1.01 a) Surface area - Minimum	The value calculated has been calculated as accurately as possible. Therefore min value = max value.
3.1.01 b) Surface area - Maximum	The value calculated has been calculated as accurately as possible. Therefore max value = min value.
3.1.02 Method used	This value is the total known area of 91D0 occurring within an SAC boundary, as determined by intersecting the 91D0 habitat shape file with the SAC shapefile. The area within SACs is considerably lower than the total area because many of the woodlands occur as small isolated stands in cutaway bog which is designated as NHA or undesignated.
3.1.03 Trend of surface area within the network	No precise data were available from the previous reporting period. However, based on the surveys the trend within SACs is probably stable with areas suffering a decline offset by areas increasing.
3.2 Conservation measures	Bog woodland that is listed as qualifying interests in SACs are protected by the 2011 Habitat Regulations; these regulate any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts on the conservation status of Bog woodland is regulated under the Environment Liability Regulations 2008. The recent initiation of a national raised bog conservation program by The Department of Arts, Heritage and Gaeltacht, aims to develop national and site specific habitat conservation objectives, to develop a National Raised Bog SAC Management Plan, to prepare draft hydrological / restoration plans for the SACs and compensatory sites, to identify priorities for undertaking works and to facilitate the implementation of the subsequent restoration programme, is taken as a very positive step by the Department to more effectively conserve Raised bog habitats. Restoration works have been undertaken and planned for the future by the NPWS, but also by Coillte and Bord Na Móna. This is taken as a very positive change in these organisations policies with multiple benefits for the conservation of Raised bog habitats, including bog woodlands.

Bog Woodland (91D0)
Article 17 Assessment 2013



Current Distribution (30 cells)

Current Range (57 cells)

Favourable Reference Range (57 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
28-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 91E0

NAME: Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2000-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published

Barron, S. & Perrin, P. (2011) Production of a habitat map for Killarney National Park, Co. Kerry. Unpublished report submitted to NPWS.
Browne, A., Dunne, F. & Roche, N. (2000). A survey of broadleaf woodland in three SACs: Barrow-Nore, River
Crushell, P. & Foss, P. (2008) The County Clare wetlands survey. Report for Clare County Council, Clare Biodiversity Forum and The Heritage Council.
Duff, K. & Denyer, J. (2012) Bride's Glen Ecological Assessment. Unpublished report for Dun Laoghaire-Rathdown County Council.
Fealy, R., Loftus, M. & Meehan, R. (2006) Soils and sub-soils mapping project. Teagasc, Dublin.
O'Donoghue, P., O'Hora, K., Gittings, T. and Delaney, E. (2009) Midleton Area Habitat Survey and Mapping Project 2009. Final report prepared for Cork County Council. Atkins, Cork.
O'Neill, F.H. & Barron, S.J. (2012) Results of a two-year monitoring survey of Annex I Old sessile oak woods (91A0) and Alluvial forests (91E0) in Ireland. Wildlife manuals series No. 71. National Parks & Wildlife Service, 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 & Wildlife Service, Dublin.
O'Riain, G., Cullen, C. & Day, A. (2007). Survey and mapping of habitats in the Carrigaline Electoral Area. Final report to Cork County Council.
Perrin, P. & Martin, J. (2007) Annex I assessment of Old Sessile Oak Woods, Alluvial forests and Taxus baccata woods. Article 17 backing documents for 2001-2006 reporting period, submitted to National Parks & Wildlife Service, Dublin.
Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. (2008) National survey of native woodlands 2003-2008. Unpublished report submitted to National Parks & Wildlife Service, Dublin.
Tubridy et al. (2006) Heritage surveys of vulnerable landscapes 2006 - habitat map for Clare County Council.
Unshin and Lough Forbes. Unpublished report submitted to National Parks & Wildlife Service, Dublin.
van der Sleesen, S. & Poole, A. (2002). Inventory of semi-natural woodlands in the eastern part of County Offaly, Ireland: a pilot study for the national inventory of native woodlands. Unpublished report submitted to National Parks & Wildlife Service, Dublin.
Wilson, F. (2009) County Sligo Wetland Survey Phase II County Report. Report submitted to Sligo County Council.

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	60500		
2.3.2 Range method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.3.3 Short-term trend period	2001-2012		
2.3.4 Short-term trend direction	stable (0)		
2.3.5 Short-term trend magnitude	min	max	
2.3.6 Long-term trend period			
2.3.7 Long-term trend direction	N/A		
2.3.8 Long-term trend magnitude	min	max	
2.3.9 Favourable reference range	area (km²)	60500	
	operator	N/A	
	unknown	No	
	method	The favourable reference range has been set as the current range as there is no evidence of decline since the Directive came into force.	
2.3.10 Reason for change	Improved knowledge/more accurate data Use of different method		

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	17.89		
2.4.2 Year or period	2000-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2001-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		
2.4.12 Favourable reference area	area (km)	151.25	
	operator	N/A	
	unknown	No	
	method	In the previous reporting period, the favourable reference area was set at 0.25% of the FRR. This model is being followed in this reporting period. The favourable reference area is therefore 151.25 sq. km. The habitat is highly fragmented in Ireland. There are many examples of small parcels of woodland which lack the structural diversity that a larger expanse of woodland would have. Fragmented woodlands may be too small to support woodland specialist species due to edge effects, or they may cease to persist because of problems related to new genetic diversity coming into the ecosystem from other woodland parcels due to excessive distances between woodland blocks that cannot be bridged by natural means of dispersal.	
2.4.13 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Main Pressures

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
problematic native species (I02)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
grazing in forests/ woodland (B06)	low importance (L)	Nitrogen input (N)

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
problematic native species (I02)	medium importance (M)	N/A
garbage and solid waste (H05.01)	low importance (L)	N/A
grazing in forests/ woodland (B06)	low importance (L)	Nitrogen input (N)

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Alnus glutinosa
Fraxinus excelsior
Salix aurita
Salix alba
Salix caprea
Salix cinerea
Salix fragilis
Salix pentandra
Salix purpurea
Salix triandra
Salix viminalis
Salix x multinervis
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

Thamnobryum alopecurum

2.7.2 Species method used	Monitoring surveys were carried out in 2011-2012 to assess structure & functions in monitoring plots within 91E0 woodlands. A minimum of 7 of the above typical species, at least one of which must be Alnus glutinosa, Fraxinus excelsior or Salix sp., had to be present in the monitoring plot for it to pass the "Typical species present" criterion of the structure and functions assessment. These species list was derived through the indicator species analysis of 91E0 relevés recorded during the national survey of native woodlands by Perrin et al. (2008).
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Estimate based on partial data with some extrapolation and/or modelling (2)
2.7.5 Other relevant information	See O'Neill & Barron (2012) for full list of structure & functions criteria assessed. Features of the canopy, shrub, field and ground layers were assessed, including minimum/maximum thresholds for %cover within a 20m x 20m plot; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of Alnus glutinosa/Fraxinus excelsior/Salix sp. and other native tree species; tree trunk size distribution; occurrence of large dead wood. The area of 91E0 that occurs within SACs is given as 10.46. However the area of 91E0 within SACs where 91E0 is listed as a Qualifying Interest is lower, at 8.62 sq. km. Note that this is a minimum figure: there may be other additional areas of 91E0 present that were not surveyed, as delineated by the predictive model of native woodland over alluvial soil.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment Favourable (FV) qualifiers N/A
2.8.2 Area	assessment Bad (U2) qualifiers stable (=)
2.8.3 Specific structures and functions (incl Species)	assessment Bad (U2) qualifiers improving (+)
2.8.4 Future prospects	assessment Bad (U2) qualifiers improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)
2.8.6 Overall trend in Conservation Status	improving (+)

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	10.46	max	10.46
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving forest habitats (3.1)	Recurrent One-off	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance Long term
Restoring/improving the hydrological regime (4.2)	Recurrent	high importance (H)	Inside	Enhance Long term
Measures needed, but not implemented (1.2)	Recurrent	medium importance (M)	Both	Unknown

Article 17 - HABITAT NOTES

Field label	Note
Habitat code: 91E0	
0.2 Habitat code	91E0 is a priority Annex I habitat. A number of variants of this woodland habitat exist, of which riparian forests of Fraxinus excelsior and Alnus glutinosa (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses are the most common type to be found in Ireland. The interpretation manual of EU habitats 2007 states that all types occur on heavy soils which are periodically inundated by the annual rise of river levels, but which are otherwise well drained and aerated during low water. The herbaceous layer includes many large species such as Filipendula ulmaria, Angelica sylvestris and Carex acutiformis, vernal species such as Ranunculus ficaria and Anemone nemorosa, and other indicative species such as Carex remota, Lycopus europaeus, Urtica dioica and Geum rivale are also listed. In addition there are gallery forests of tall willows (Salicion albae) alongside river channels and occasionally on river islands, where the tree roots are almost continuously submerged. They are dominated by Salix alba, S. viminalis and S. triandra, sometimes with S. cinerea but alder is relatively rare. There is a luxuriant herb layer of Phalaris arundinacea, Urtica dioica, Filipendula ulmaria, etc.
1.1.02 Method used - map	The distribution is largely based on field surveys carried out between 2003 and 2007 for the National Survey of Native Woodlands (Perrin et al. 2008) as well as a monitoring survey carried out between 2011 and 2012 (O'Neill & Barron 2013). Some additional relevé data were gathered in the pilot study for the NSNW (van der Sleesen & Poole 2002, Browne et al. 2000). Additional sources were consulted to produce as accurate a distribution map as possible of known 91E0 habitat; these are all listed in 2.2 Published sources. Potential 91E0 areas were derived by performing an intersect between the "native woodland.shp" modified FIPS shapefile (produced as one of the outputs of the NSNW) and a subset of the soils map of Fealy et al. (2006) that contains only alluvial soil polygons (AlluvMIN).
1.1.03 Year or period	Most of the data on which the assessment is based are from field surveys carried out between 2003 and 2007 for the National Survey of Native Woodlands (Perrin et al., 2008) and the monitoring survey carried out between 2011 and 2012 (O'Neill & Barron, 2013). Some external data were incorporated from the pilot study for the NSNW (van der Sleesen & Poole 2002, Browne et al. 2000) and from a number of other sources (listed in 2.2 Published sources), including SAC GIS shapefiles and site synopses from NPWS, some of which date back to 1997, but most of the additional sources were dated 2006-2012.
1.1.04 Additional distribution map	A distributution map was derived by intersecting the sources outlined in 1.1.2 with the Irish National 10 km2 Grid.
1.1.05 Range map	The range map was derived from the distribution map referred to in 1.1.4 using the Range tool.

Field label	Note
Habitat code: 91E0	
2.2 Published sources	A comprehensive national survey of native woodlands (NSNW) was carried out in Ireland between 2003 and 2007 (Perrin et al. 2008). The final report included guidelines for the assessment of Annex I woodland sites; these guidelines were used in the monitoring survey carried out on 40 alluvial forest sites between 2011 and 2012 (reported in O'Neill & Barron 2013). Perrin & Martin (2007) drew up criteria for determining the Annex I status of woodland relevés; these criteria were used to retrospectively determine the Annex I status of all NSNW relevés. O'Neill et al. (2010) digitised hand-drawn maps produced during the NSNW (because Annex I assessment and mapping were not within the remit of the NSNW) and extrapolated Annex I status from relevés to polygon level using a combination of information from the hand-drawn maps, aerial photograph interpretation and information from the ecologists who surveyed the sites. The additional published sources primarily refer to datasets consulted in the compilation of the distribution map and which contributed supplementary polygons not identified in the original NSNW. Additional sources Fingal Co. Council: Data from Compass Informatics; data received in 2010. Coillte priority woodland sites GIS shapefile: Durrow, Clonbur & Camcor polygons. Park Hill site from NPWS draft file of sites for inclusion in Woodland monitoring survey 2011-12: originally suggested by Daniel Kelly, unpublished data. SAC site synopses and boundary shapefile IG_SACs_NTv2_QI_Hab (incorporating Qualifying Interest information) from NPWS. NPWS (2009). Site Inspection Reports (1998-2009). Unpublished data. National Parks & Wildlife Service, Dublin. Roughan & O'Donovan Consulting Engineers (in prep.) Limerick Northern Distributor Road. Supplementary Constraints Information. Report for Clare County Council. NPWS-Management Planning Support Unit Maps 2405_imap95 (CPU_Habitats_March_2012).
2.3.01 Surface area - Range	This is derived from the range map referred to in 1.1.5.
2.3.02 Method used - Range	The extensive survey work on which some of the publications listed in 2.2 were based led to the production of a 91E0 distribution map, which was used as the basis for the range map created using the range tool. (See also note 2.4.1 below.) However, this should be regarded as the absolute minimum of the habitat in Ireland: there are many smaller areas of 91E0 woodland that were not surveyed. A predictive model was used to estimate the full range of this habitat in Ireland by basing the range map on native woodland (as identified by a 2003 modified version of the Forest Inventory and Planning system (FIPS) 1998 dataset that excludes conifers, cleared areas and woodland blocks <1ha) that occurs on alluvial soil (as determined by the digital soils map of Fealy et al. (2006)). Polygons smaller than 400 sq. metres were deleted. 10k grid squares containing only one or two “native woodland x alluvial soil” polygons >400 sq. m were examined to determine whether the 10k square genuinely held potential 91E0. Patches contiguous with potential woodland in adjacent squares were retained. Finally, the remaining potential 91E0 polygons were merged with those from the confirmed 91E0 distribution map to produced a file of actual+potential 91E0 habitat, which was used to derive the range map in 1.1.5.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no evidence that the range has changed in any way, climatically or edaphically, in the last 12 years, as areas of the habitat throughout its range have been visited during this period of time. Therefore the range is stable.

Field label	Note
Habitat code: 91E0	
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Range calculated for 2001-2006 reporting period was estimated, based on an incomplete survey (NSNW fieldwork finished in 2007, after the Article 17 reports were submitted). Range calculated for the current reporting period is partly based on more accurate data derived from the full nationwide survey, together with follow-up surveys of some of those sites during the 2011-12 monitoring survey.
2.3.10 c) Reason for change - use of different method	The method used to calculate the range has changed since the 2007 reporting period in a number of ways: 1) Use of the range tool. 2) A different model was used from the last reporting period for the prediction of potential 91E0 habitat: an intersect was carried out between a modified FIPS98 dataset (native woodland >1ha) and an alluvial soils subset of the soils map of Fealy et al. (2006) and the selected polygons examined (the 2007 model took proximity to watercourses into account as well as presence on alluvial soil). There is also an element of subjectivity involved in deciding which polygons are likely to represent potential 91E0 habitat, and personnel carrying out the predictive models changed between 2007 and 2013.
2.4.01 Surface area	Surface area is primarily based on comprehensive field surveys carried out for the national survey of native woodlands (NSNW) between 2003 and 2007 and mapped post hoc in 2010. However, additional areas were mapped from other sources, such as surveys carried out on behalf of county councils or NPWS (all listed under 2.2. Published sources). For polygons that originated from the NSNW, some are mapped as pure 91E0 stands (8.15 sq km) while others are mapped as mosaics of 91E0 and non-91E0 woodland (4.38 sq m). For the purposes of area calculation, these mosaics are included in the total area as though they were pure 91E0 stands; thus the total area of [91E0+other woodland habitat] mosaic represents the highest possible value of 91E0 in these mosaics. An additional 5.36 sq km of 91E0 woodland was added from other sources such as county council surveys. The total area of 17.89 sq. km should be regarded as the minimum area of 91E0 habitat within the country, as there are likely to be many small pockets of 91E0 woodland that have not been surveyed or whose Annex I status was not determined during the NSNW. The predictive model described in note 2.3.2 resulted in the delineation of an additional 45.25 sq. km of potential 91E0 habitat in Ireland.
2.4.02 Year or period	Field surveys for the NSNW were carried out between 2003 and 2007 (Perrin et al. 2008), with follow-up surveys in 2011-2012 (O'Neill & Barron 2013). Other 91E0 sites were identified during the pilot survey for the NSNW, carried out in 2001 (van der Sleesen & Poole 2002), and during a survey by Browne et al. (2000). Other sites were included from miscellaneous sources, mostly dated 2006-2012.
2.4.03 Method used - Area covered by habitat	The reported area is based on field surveys and supplementary data sources outlined in 2.2 Published sources, and is the absolute minimum of this habitat in Ireland. Additional areas may also occur (as noted above in 2.3.2 Methods used – range), and based on the area of native woodland occurring on alluvial soil, an additional 45.25 sq. km of potential 91E0 habitat was identified.
2.4.04 Short-term trend - Period	The default trend period was used.

Field label	Note
Habitat code: 91E0	
2.4.05 Short-term trend - Trend direction	Short-term trend direction has been gauged based on examination of 40 sites surveyed between 2011 and 2012 and comparison with their area in aerial photographs dated 2000; information from other forestry bodies, e.g. Coillte, Forest Service, was also taken into account. The trend was stable other than a small loss in area identified in one of the 40 sites. Furthermore, increases in 91E0 habitat (as well as improvements to condition of existing areas) have occurred because of rehabilitation of three alluvial woodlands covering 136 ha within the Coillte estate. These should serve to offset any area losses that may have been incurred in sites for which no area change information is available. Thus the short term trend direction is taken to be stable nationally.
2.4.07 Short-term trend - Method used	As noted above in note 2.4.5, short-term trend direction has been gauged based on examination of 40 Annex I alluvial forest sites surveyed between 2011 and 2012, a subset of the national resource, and on information from other forestry bodies. The current areas of the sites (from 2012 field maps) were compared with their area on aerial photographs dated 2000. The area of the majority of the 40 sites remained stable but there was a nett loss overall (two sites experienced area losses), which amounted to 0.2% of the total area of woodland assessed. This has been offset by gains due to rehabilitation of 136 ha of alluvial forest habitat within the Coillte estate. While the main effect of such rehabilitation is the improvement of structure and functions, some area increases have been achieved through new plantings (though not yet of Annex I quality). Exact figures for recent area changes (whether losses or gains) of alluvial woodlands that were not surveyed recently could not be determined due to the lack of up-to-date aerial photographs. However, on the basis of the data available, area trend has been determined to be 0 stable.
2.4.12 a) Favourable reference area - In km2	In the previous reporting period, the favourable reference area (FRA) for 91E0 habitat was set at 0.25% of the favourable reference range, based on the area of alluvial soil within the country (expansion of 91E0 should be targeted at areas with alluvium as a substrate; the FRA given represents approximately 5% of the area of alluvial soil in the country). The same model is being followed for this reporting period. The FRA for 91E0 habitat in Ireland is therefore much greater than its current surface area. Peterken (2002: cited in Perrin et al. (2008)) suggests that large woods should be maintained above 25ha, with smaller woods being at least 3ha, and the FRA given would permit one large woodland or several smaller woodlands within each 10km square. The high incidence of fragmentation of the resource is cause for concern and, as well as area increases, greater connectivity needs to be established between individual pockets of woodland to decrease their isolation and increase gene and species flow between blocks.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The figure given here for surface area of 91E0 is based on a comprehensive national survey, although some smaller 91E0 sites were not surveyed. The figure for area given in the last reporting cycle was based on an incomplete survey plus extrapolated data in which some sites had not yet been ground-truthed. As noted in 2.4.1 above, the figure given for surface area represents the minimum area of 91E0 habitat in Ireland; the actual figure is likely to be higher.
2.4.13 c) Reason for change - use of different method	A different method was used in 2001-2006 to calculate the surface area of the habitat as the national survey was still incomplete at that time. The area calculated for 2007-2012 is based primarily on actual surveys and should be taken as a minimum value for the area of the habitat in the country, as there are likely to be other pockets of 91E0 woodland present throughout the country on alluvial soil. An additional 45.25 sq. km of potential 91E0 habitat was delineated by the predictive model described in note 2.3.2.

Habitat code: 91E0

Field label	Note
2.5 Main pressures	See Note for “2.5.1 Methods used – Pressures” for how rankings were decided. I01 Invasive non-native species have a high incidence and impact a large area of 91E0 habitat nationwide, possibly because of the potential of rivers to cause disturbance and to act as a conduit for seeds. Invasive species were noted in two SIR reports and were the main negative impact noted during the WMS (13 high intensity, 5 instances affecting >50% of site; 14 medium intensity, 2 instances affecting >50% of site, 7 low intensity, 4 instances affecting >50% of site). The most important species are Acer pseudoplatanus and Fagus sylvatica, seedlings and saplings of which were frequently recorded. I02 Problematic native species are listed because of consequences arising from undergrazing; brambles are the most usual problem species, with nettles also forming dense stands in some cases, particularly if nutrient enrichment has occurred. Evidence of this impact comes from the WMS (noted at 8 of 40 sites: 2 high intensity, 1 instance affecting >50% of site; 5 medium intensity, 4 instances affecting >50% of site; 1 low intensity, not affecting >50% of site). Higher incidence of wet summers in recent years may have contributed to the problem of undergrazing, with woodlands becoming too wet to support grazers. Note that, though H05.01 (the code used for dumping, including fly-tipping and flotsam washed in by rivers/lakes) is listed here with a Low ranking, it occurs at a medium frequency (15 of the 40 WMS sites surveyed); however, its impact on the habitat is deemed to be low (11 of the 15 instances occurred at low intensity and affected <50% of the surveyed habitat) as usually only small areas, generally at the edges of woodlands, are affected, and the ecological impact, though likely to be negative, is slight. The main danger arises from the potential introduction of invasive alien species. The B06 Grazing indicated here is overgrazing, most frequently by cattle, which impacts on regeneration success and also causes nutrient enrichment through dunging (pollution qualifier N ticked on report). While overgrazing is serious where it occurs, the incidence in wet woodlands nationally is low. In the WMS, overgrazing was noted at two of the 40 sites surveyed.. Pollution from agricultural land, septic tanks etc may also impact on alluvial woodlands, the most serious impact occurring in oligo- and meso-trophic systems. Other pressures that have not been listed but operate at a local level or on a small scale include: B02.06 Thinning of tree layer; J02.07 Water abstractions from groundwater (usually caused by drainage of land for forestry or agricultural purposes; occasionally adverse affects due to dredged deposits from cleared drains); G01.02 Walking, horse-riding & non-motorised vehicles (minor trampling issues); J02.04.01 Flooding (alteration of natural flooding regime due to improperly functioning drains, causing long-term inundation and nutrient enrichment); D01.01 Paths, tracks, cycling tracks and D01.02 roads/motorways, due to adverse effects on the hydrology of wet woodlands, as well as (in the case of larger roads) noise and pollution impacts from traffic on roads that run along or through woodlands. While there is potentially a danger that road construction may result in some wet woods being partially removed (which was a problem in 2001-2006, e.g. N11 at Kilmacanogue), this was not borne out by monitoring surveys carried out in 2011-12). However, the lack of up-to-date orthographic aerial photographs is a disadvantage, as field maps based on 2005 data may not have reflected small changes in habitat area that occurred between 2005 and 2012.

Field label	Note
	Pollution qualifier: The reporting form makes it possible to add a pollution qualifier to an impact. For overgrazing the pollution qualifier "N" has been added to signify that nitrate pollution is an additional possibility when overgrazing occurs and also from effluent run-off. In alluvial forests the problem of this pollution finding its way into watercourses is a greater risk than in drier woodlands. Fertiliser drift from adjacent agricultural land may also impact on some sites.
2.5.01 Method used - pressures	Impact data recorded during the WMS in 2011-12 were used in this assessment. SIR data on impacts noted in protected areas by NPWS rangers between 2007 and 2009 (latest data available) were also incorporated, although only four reports referred directly to 91E0 habitat (those that referred to Fossitt codes or old habitat codes were not included as there was no guarantee that it was Annex I habitat that was being affected). High impact pressures with a high incidence were given a ranking of High. Medium impact pressures (e.g. problematic native species) with a medium incidence were given a Medium ranking. High impact pressures with a medium to low incidence were given a ranking of Low. Low impact pressures with a high incidence were given a ranking of Low. Impacts that were recorded in a very small number of sites were not included.
2.6 Main threats	This is derived from the pressures operating on the habitat during the reporting period. There is no impending legislation and no projected changes to indicate that any of the pressures listed in 2.5 will become either more or less severe than in the last 12 years. There is a possibility that recent years of high rainfall may have an adverse effect on grazing patterns (e.g. causing undergrazing/problematic native species to increase to a high ranking threat) in the future; this may also lead to an increase in drainage (for example, through the digging of new drains to remove excess rainwater), but as this is speculation rather than based on hard data, the unaltered pressures list in 2.5 has been used to project threats over the coming reporting period. The current economic climate has led to an increase in unregulated felling for fire wood which may impact negatively on the habitat.
2.7 Complementary information	The list of indicator species used in WMS 2011-2012 is presented and their assessment is explained in 2.7.2.
2.7.04 Structure and functions - Methods used	The structure and functions (S&F) assessment results from the 40 sites surveyed during the WMS were extrapolated up to a national level. Each site was assessed (using 4 monitoring plots per site) with relation to features of the canopy, shrub, field and ground layers, including minimum/maximum thresholds for %cover within a 20m x 20m plot; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of Alnus glutinosa/Fraxinus excelsior/Salix sp. and other native tree species; tree trunk size distribution; occurrence of large dead wood. Overall, S&F failed in 37.5% of monitored sites. Criteria such as positive indicator species, canopy height, canopy cover, native shrub layer cover and native field layer cover all generally performed well across the majority (>85%) of monitoring plots. However, problems with invasive and non-native species were frequent, causing 58% of monitoring plots to fail due to the presence of negative species regeneration (seedlings or saplings of non-native and invasive species) and 22.5% of plots to fail due to high (>10%) cover of negative species. Thus negative species appear to be a persistent problem within 91E0 woodlands and are frequently recorded as a high-intensity pressure. This, in combination with the relatively high failure rate (37.5%) of S&F across the monitoring sites, result in a S&F assessment of U2-Bad for 91E0 woodlands.

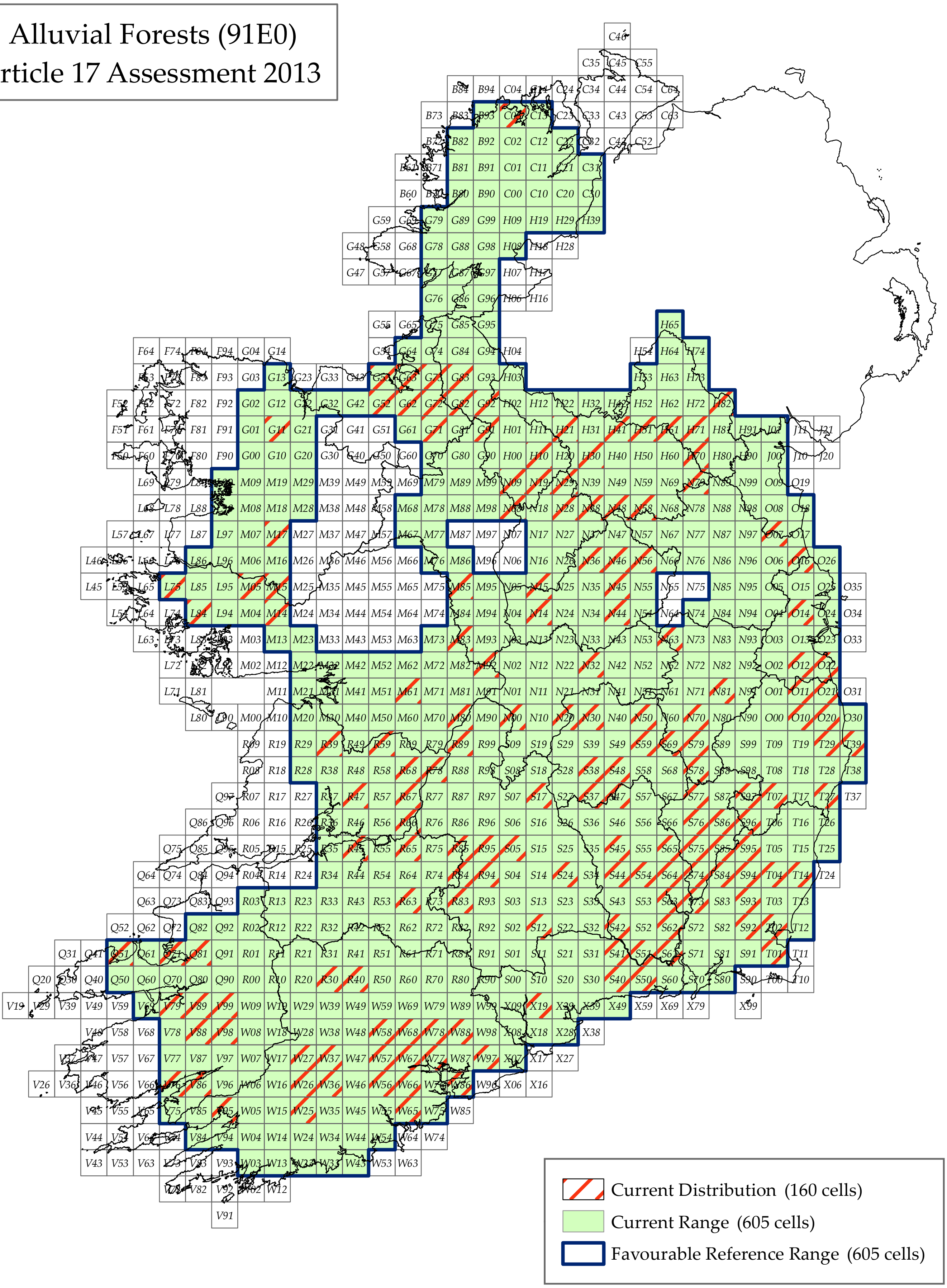
Field label	Note
Habitat code: 91E0	
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	It was stated in the 2007 reporting document that the (then) current range would be taken to be the favourable reference range. The range calculated for this reporting period is used in preference to that calculated for 2000-2006 because the data used to produce the range map for this reporting period are more accurate. The current range and the favourable reference range are taken to be approximately equal, so the range assessment is Favourable.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Area conservation assessment is evaluated as U2-Bad because the favourable reference area for 91E0 has been determined as 0.25% of the range and the current area of 91E0 is currently far less than this value.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Although area conservation assessment is U2-Bad, further large-scale losses in the habitat are not anticipated, largely as a result of the more widespread implementation of Appropriate Assessment and partly also because of the recent decrease in large-scale national infrastructure projects such as road construction. Any small-scale losses occurring should be offset by planting of native broadleaved trees that is taking place in some sites in state ownership. While the main effect of such rehabilitation is the improvement of structure and functions, some area increases have been achieved through new plantings (though not yet of Annex I quality). The area assessment is thus expected to improve in the future as plantings are expected to continue and these newly-planted areas will mature, it is hoped, into Annex I woodland.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The thresholds used by Belgium in the last reporting period (see guidance in Evans & Arvela 2011: p. 48) were used to assess the national status of structure and functions (S&F), in conjunction with an examination of the nature of the failures across all sites monitored. The 40 alluvial forest sites monitored in 2011-12 were used as a proxy for the national resource of 91E0 and the percentage of sites that received each assessment was used instead of percentage of area. The actual number of sites receiving a U2-bad assessment for S&F was 15 (37.5% of sites), which is above the 25% threshold set for U2-Bad. This, in conjunction with the fact that the high-ranking pressure I02 Invasive species occurred frequently within sites and caused 58% of plots to fail, results in a national assessment for S&F for 91E0 woodlands as U2-Bad.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	The condition of 91E0 structure and functions nationally is improving due to the rehabilitation of large areas of alluvial woodland, particularly in the Coillte estate and in some sites within NPWS ownership, from which non-native and invasive species are being removed and drainage has been blocked.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Based on guidelines in Evans & Arvela (2011) (p. 35), future prospects are evaluated nationally as U2-Bad because the area extent of 91E0 is not expected to reach the favourable reference area within the next two reporting periods, and structure & functions are likewise unlikely to exceed the favourable reference thresholds within the next 12 years.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	Future prospects are improving for 91E0 woodlands due to the implementation of screening for Appropriate Assessment and restoration of some woodlands in state and semi-state ownership.

Field label	Note
Habitat code: 91E0	
2.8.05 Overall assessment of Conservation Status	The completed national woodland survey by Perrin et al. (2008) provided more extensive distribution data on Irish Annex I alluvial woodlands than was available for the 2007 reporting period; additional distribution information was also brought in from a number of other sources that were not available in 2007, notably the Killarney National Park habitat survey of Perrin & Barron (2011). These more accurate data resulted in new figures for Area. However, the distribution was not deemed to be sufficient to define the Range accurately. Range was therefore determined by extrapolation from a predictive model using the occurrence of native woodland over alluvial soil. This resulted in a different figure for Range from that obtained in 2007 (in which a similar predictive model was used); however, this was due to differences in the methodology and the exercising of expert judgement rather than actual differences in the Range. There is no evidence of decline of the Range, so this was assessed as Favourable. The Favourable Reference Area is much higher than the current area due to the high degree of fragmentation of this habitat in Ireland, which precludes its long-term viability from being regarded as assured. The current area (17.89 sq. km) is only 11.9% of the FRA (150.25 sq. km); it was therefore assessed as Unfavourable – Bad. Structure and functions were assessed by examining habitat data such as: typical species; features of the canopy, shrub, field and ground layers; presence of invasive species, including mature specimens and regeneration; evidence of grazing pressure; presence of regeneration of target species (Fraxinus excelsior, Alnus glutinosa, Salix spp.) and other native tree species; tree trunk size distribution; and occurrence of large dead wood. The main pressures operating in alluvial woodlands were also examined. Non-native and invasive species, especially Acer pseudoplatanus and Fagus sylvatica, and problematic native species such as Rubus fruticosus and Urtica dioica (a consequence of undergrazing) were regarded as the main problems affecting Annex I alluvial woodlands; these have negative repercussions on other structural parameters such as presence of typical species, cover of shrub, field and bryophyte layers, and regeneration of native tree species. Structure and functions and Future prospects were each assessed as Unfavourable – Bad, due to the high incidence of non-native and invasive species, together with the issue of woodland fragmentation, which can be regarded as an additional criterion affecting the condition of the resource nationally that is not at an optimum level. The overall assessment has been evaluated as Unfavourable – Bad due to the assessment of three of the four parameters (Area, Structure and Functions, and Future Prospects) as Unfavourable – Bad.
2.8.06 Overall trend in Conservation Status	There have been national efforts to remove non-native and invasive plant species, reinstate correct hydrological regimes and generally to improve the conservation status of 91E0 woodlands through EU-Life funded programmes. Some substantial areas have been rehabilitated, and this is the main reason for the improving trend reported. These efforts are being negated to a certain extent by the increasing evidence of woodland abandonment, where domestic stock have been completely removed and native species such as brambles and nettles are becoming a problem. Non-native invasive species (especially Acer pseudoplatanus) in smaller, privately owned woodlands also continue to be a problem.
3.1.01 a) Surface area - Minimum	This value is the total area of 91E0 habitat occurring within an SAC boundary, as determined by intersecting the 91E0 habitat shapefile NCADist_91E0 with the SAC boundary shapefile IG_SACs_NTv2_QI_Hab. The total area of 91E0 habitat that is listed as a Qualifying Interest within these SACs is lower, 8.62 sq km, as not all 91E0 recorded is a QI for the SAC within which it occurs.

Field label	Note
Habitat code: 91E0	
3.1.01 b) Surface area - Maximum	The value calculated for 3.1.1 (a) has been calculated as accurately as possible. Therefore min value = max value. However, the value calculated is the minimum area of the habitat within SACs in Ireland, as pockets of 91E0 potentially exist throughout the country, as noted when calculating the range (see notes 1.1.4 and 2.3.2 above).
3.1.02 Method used	The distribution map of confirmed 91E0 habitat was derived from a nationwide survey of alluvial woodlands. This was intersected with the SAC boundary shapefile IG_SACs_NTv2_QI_Hab to give the total area in sq km of 91E0 located within SACs. As noted above, the area of 91E0 listed as a QI within SACs is lower, and was calculated by totalling areas of polygons for which there was an entry in the HD_91E0 column of the IG_SACs_NTv2_QI_Hab shapefile.
3.1.03 Trend of surface area within the network	The restoration and replanting work noted in note 2.4.5 has taken place within SACs during the current reporting period. While data are not available for all SACs within the network, no large-scale woodland removal was noted in Site Inspection Reports completed by NPWS rangers. The area is thus judged to be, at a minimum, stable within the network.

Field label	Note
Habitat code: 91E0	
3.2 Conservation measures	Expert judgement was used in all cases to determine rankings of conservation measures. 3.1 Restoring/improving forest habitats: Conservation measures, such as non-native/invasive species removal (e.g Acer pseudoplatanus, conifers), are being implemented in some sites within the Natura 2000 network, especially state/semi-state-owned sites. They are also applied in some sites outside the network, but to a lesser degree, and this can depend on whether or not the woodland is state-owned or privately owned. Financial and personnel constraints are likely to be a consideration here, especially for private landowners. Culling of deer is employed locally to reduce problems of overgrazing. 6.3 Legal protection of habitats and species: this measure is in place to impose legal protection on a subset of the national 91E0 resource. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow it to proceed. Each plan or project must consider the possible effects it may have in combination with other plans and projects when going through the process known as appropriate assessment. The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required. This is termed AA screening. Its purpose is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives (from "Appropriate assessment of plants & projects – Guidance for planning authorities" (2009) DoEHLG). 1.2 Measures needed but not implemented: this has been taken to refer to management that should be carried out but for financial, logistical or other reasons has not been implemented, although the need for it is clear. The broad evaluation of the measure is entered as "Unknown" - if the required measures were to be implemented the effect would unquestionably be positive, and not implementing them is potentially detrimental. 4.2 Restoring/improving the hydrological regime: this is being carried out in a number of alluvial woodland sites, e.g. Castle Durrow Demesne, Co. Laois. 6.1 Establish protected areas/sites: Some areas such as proposed NHAs have not yet been designated and they lack the level of legal protection afforded to SACs. However, they have limited protection, for example, they are recognised by planning and licensing authorities as having ecological value, and they require approval is required from NPWS before Forest Service afforestation grants will be paid on pNHA lands

Alluvial Forests (91E0)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
03-05-13

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

CODE: 91J0

NAME: Taxus baccata woods of the British Isles

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.2 Distribution Method	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2011-2012
1.1.4 Additional map	Yes
1.1.5 Range Map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published	Cross, J. & Lynn, D. (2013). Results of a monitoring survey of Yew Woodland (91J0). Irish Wildlife Manuals, No. 72. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Perrin, P.M, Martin, J.R., Barron, S.J., O'Neill, F.H., McNutt, K.E. and Delaney, A. (2008) National Survey of Native Woodlands 2003-2008. Unpublished report submitted to National Parks and Wildlife Service, Dublin. http://www.npws.ie/publications/archive/Perrin_et_al_2008_NSNW_V1.pdf

2.3 Range of the habitat type in the biogeographical region or marine region

2.3.1 Surface area - Range (km²)	700	
2.3.2 Range method used	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	1200
	operator	N/A
	unknown	No
	method	Although there has been no recorded decline in range since the Directive came into force the restricted distribution of this habitat is not considered adequate. The Favourable Reference Range exceeds the current range. 5 additional squares have been added as they contain suitable habitat with scattered trees and small stands of yew which have the potential to develop into yew woodland. 3 are on the eastern edge of the Burren and 2 on the Mayo/Galway border between Loughs Mask and Corrib. Coillte have opened up existing coniferous forests containing yew and also planted additional trees in several sites within these squares.
2.3.10 Reason for change	Improved knowledge/more accurate data	

Report on the main results of the surveillance under article 17 for annex I habitat types (Annex D)

2.4 Area covered by Habitat

2.4.1 Surface area (km²)	0.8319		
2.4.2 Year or period	2011-2012		
2.4.3 Method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.4 Short-term trend period	2000-2012		
2.4.5 Short-term trend direction	stable (0)		
2.4.6 Short-term trend magnitude	min	max	confidence interval
2.4.7 Short term trend method used	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.8 Long-term trend period			
2.4.9 Long-term trend direction	N/A		
2.4.10 Long-term trend magnitude	min	max	confidence interval
2.4.11 Long term trend method used	N/A		

2.4.12 Favourable reference area	area (km)	1.5
	operator	N/A
	unknown	No
	method	Some existing sites have the potential for expansion and some potential sites are undergoing restoration measures. The exact figure is difficult to estimate. However the area covered by the habitat should be greater than the current area.

2.4.13 Reason for change	Improved knowledge/more accurate data

2.5 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
grazing in forests/ woodland (B06)	high importance (H)	N/A

2.5.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.6 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	medium importance (M)	N/A
grazing in forests/ woodland (B06)	medium importance (M)	N/A

2.6.1 Method used – threats	expert opinion (1)

2.7 Complementary Information

2.7.1 Species
Taxus baccata
Fraxinus excelsior
Corylus avellana
Ilex aquifolium
Lonicera periclymenum

Quercus robur
Sorbus aucuparia
Brachypodium sylvaticum
Phyllitis scolopendrium
Potentilla sterilis
Viola riviniana
Carex flacca
Metzgeria furcata
Isothecium myosuroides
Thamnobryum alopecurum
Fissidens dubius
Neckera complanata
Neckera crispa
Quercus petraea
Luzula sylvatica
Blechnum spicant
Vaccinium myrtillus

2.7.2 Species method used	The derived list of typical species were based on data obtained from surveys of native woodland, especially the National Survey of Native Woodland. 5 Yew woodlands were monitored in 2011 (Cross & Lynn, 2013). In each site, 2-4 monitoring plots measuring 20m x 20m were used to gather structure and functions assessment data including positive indicator species. The target for positive indicator species was for at least 6 species from this list to be present at every plot surveyed. A general assessment only was undertaken for Kylagowan, which occurs on a different substrate.
2.7.3 Justification of % - thresholds for trends	
2.7.4 Structure and functions - methods used	Complete survey/Complete survey or a statistically robust estimate (3)
2.7.5 Other relevant information	82.95 ha of yew woodland fall within 7 SACs. 5 SACs list yew woodland as a qualifying interest covering an area of 79.29 ha. Although there is no evidence of decline since the Directive came into force, the current Area is not considered adequate to ensure the long term survival of the habitat. Both favourable reference range and area are very much dependent on suitable habitat, which is very restricted except within the Burren. Favourable Reference Values were set to encompass areas where Yew is present and could be managed to become Yew Woodland. As efforts are being undertaken to restore some of these areas and as grazing pressure is declining within parts of the Burren, the assessments for Range and Area, although Unfavourable Bad, are considered to be improving. The quality of the exisiting Yew Woodlands is still poor due to overgrazing, lack of regeneration and invasive species (Cross & Lynn, 2013). As these issues are being tackled at most sites (removal of invasive species, control of grazing), Structure & Functions is assessed as Unfavourable bad but improving and Future Prospects as Unfavourable Inadequate improving. Therefore the Overall assessment is Unfavourable Bad improving.

2.8 Conclusions (assessment of conservation status at end of reporting period)

2.8.1 Range	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.2 Area	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.3 Specific structures and functions (incl Species)	assessment	Bad (U2)
	qualifiers	improving (+)
2.8.4 Future prospects	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.8.5 Overall assessment of Conservation Status	Bad (U2)	
2.8.6 Overall trend in Conservation Status	improving (+)	

3. Natura 2000 coverage conservation measures - Annex I habitat types on biogeographical level

3.1 Area covered by habitat

3.1.1 Surface area (km²)	min	0.8295	max	0.8295
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3. Trend of surface area	increase (+)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Restoring/improving forest habitats (3.1)	One-off	high importance (H)	Both	Enhance Long term
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

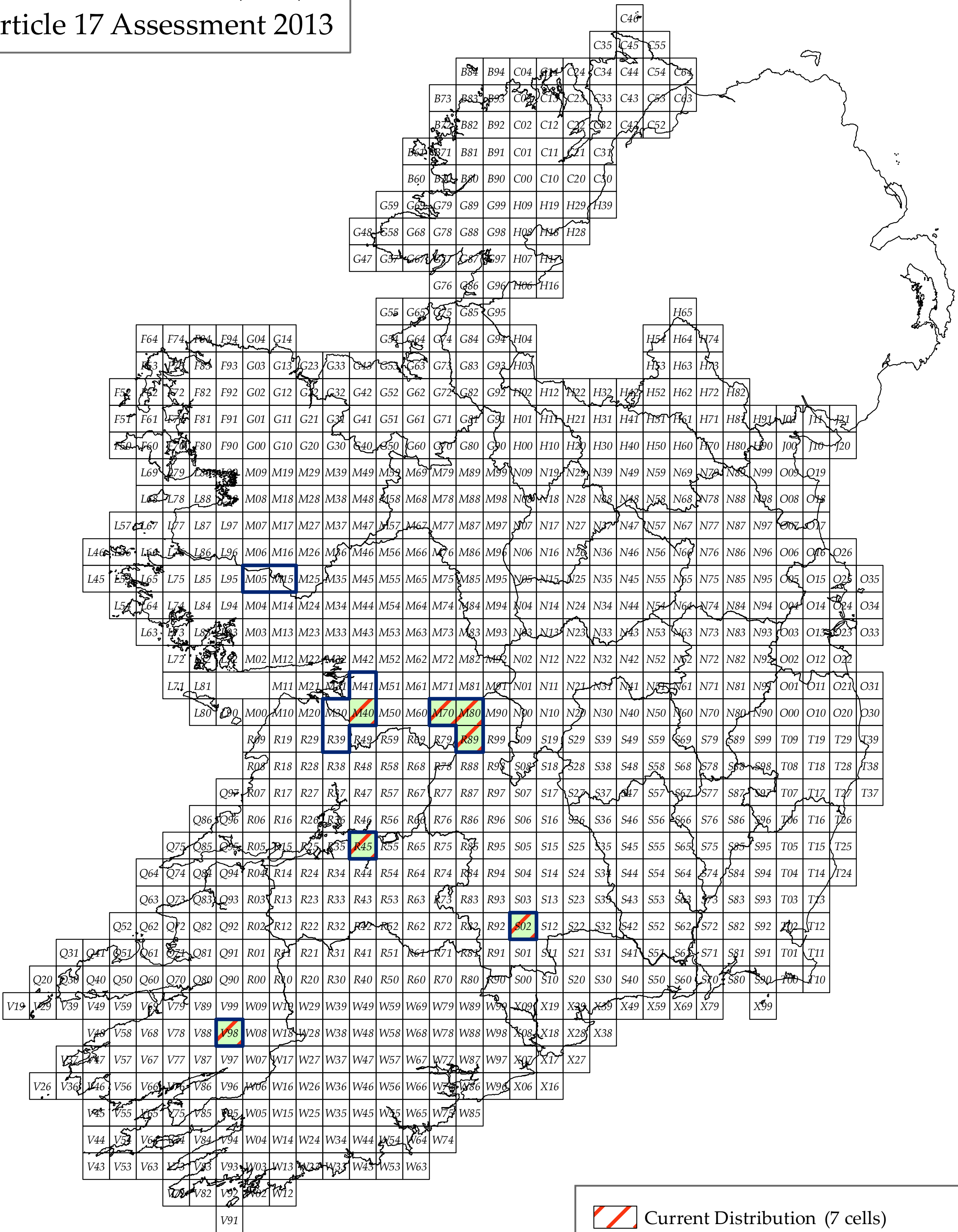
Field label	Note
Habitat code: 91J0	
0.2 Habitat code	Yew woodland is a highly restricted habitat type in Ireland which occurs at a handful of sites in the southwestern part of the country mostly on skeletal soils over limestone outcrops or pavement. The canopy in these stands is typically dominated by Taxus baccata with Fraxinus excelsior and frequently the introduced Fagus sylvatica. Corylus avellana and Ilex aquifolium are frequent components of the shrub layer but typically in small quantities. The dense evergreen canopy is inimical to the strong development of the field layer and regeneration is very limited or absent. The herb layer is characteristically both species-poor and poorly developed with the most frequent and abundant species being Hedera helix, which is locally dominant, Brachypodium sylvaticum, Viola riviniana and ferns, especially Phyllitis scolopendrium. A striking feature is the rocky forest floor which is typically covered by an extensive carpet of bryophytes dominated by a few robust pleurocarpous species, e.g. Thamnobryum alopecurum, Neckera crispa and Isothecium myosuroides. Locally, in east Galway(Kyleagowan), yew woodland with sessile oak (Quercus petraea) and holly (Ilex aquifolium) occurs on podzols over acidic tills. The associated field layer is typical of 91AO (Sessile Oak woodlands with holly and hard fern) with species such as Luzula sylvatica, Blechnum spicant and Vaccinium mrytillus.
1.1.02 Method used - map	Cross & Lynn (2013) undertook a detailed field survey of 5 sites. A general survey, i.e. without polygons, was undertaken for one other site (Kyleagowan). Several other sites with small stands of mature yew trees, previously recorded as yew woodlands, were visited but were dismissed as qualifying as Yew Woodlands. Several sites have been planted with yew within the last 5 years by Coillte as part of the LIFE Project 'Restoring priority woodland in Ireland' in an attempt to expand the area of yew woodland but these cannot be considered as yew woodland at this stage.The polygons from the National Survey of Native Woodlands have been updated following the more recent survey. These 5 sites have been approximated by field-derived locations mapped to 2005 Aerial Photos.
1.1.03 Year or period	All records were validated in the field during these dates.
1.1.04 Additional distribution map	Polygons referred to in 1.1.2 intersected with the ING 10 km square grid.
1.1.05 Range map	The current Range equals the current distribution following NPWS standardised rules. All blocks of distribution squares are disjunct as they are more than 3 grid squares away from the next block.
2.2 Published sources	Cross & Lynn (2013) report on the first year of a monitoring survey which assesses the structure and functions and future prospects of Annex I woodland type: 91J0 Yew woodland. 5 Yew woodlands were monitored in 2011. In each site, 2-4 monitoring plots measuring 20m x 20m were used to gather structure and functions assessment data including indicator species, cover of individual woodland layers, canopy height, presence of non-native species, stand structure and estimates of quantities of dead wood. Future prospects were assessed by noting the pressures, threats and impacts, both positive and negative, occurring throughout the Annex I woodland area. Perrin et al. (2008) classified Irish woodlands and proposed monitoring protocols for annexed woodland types. An additional but anomalous site was located in 2013 but monitoring plots were not assessed.

Field label	Note
Habitat code: 91J0	
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5
2.3.02 Method used - Range	All known or potential Yew woodlands were visited in the period 2011-13.
2.3.04 Short term trend - Trend direction	The main stands of yew woodland have been known for many decades but a few have only been recorded in recent years. Baseline monitoring was completed for all Yew woodlands in 2011. Limited ecological data for some sites obtained from the National Survey of Native Woodlands, NPWS site files and other earlier studies suggest that there have been no losses in the recent past and accordingly the short term trend for range is considered to be stable for the default time period. Sites which have been planted with yew do not currently qualify as the habitat but could potentially result in an expansion of the area and range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The 2007 submission included Yew woodlands that do not qualify as the habitat. All Yew & potential Yew woodlands have been visited and verified in the interim period and an additional site located. The Range was adjusted accordingly.
2.4.01 Surface area	The polygons derived for each sites were summed to give a national estimate.
2.4.02 Year or period	The area for all known Yew Woodlands was estimated from sites visited in the field in 2011-2013.
2.4.04 Short-term trend - Period	The default trend period was used.
2.4.05 Short-term trend - Trend direction	There have been small increases in the area of Yew Woodland at some sites following planting of Yew around the margins of existing stands and the creation of new stands, totalling c.46 ha. These areas will not form new Yew woodlands for several decades. However the trend has been given as increasing.
2.4.13 b) Reason for change - improved knowledge/more accurate data?	The 2007 submission included Yew woodlands that do not qualify as the habitat. All Yew & potential Yew woodlands have been visited and verified in the interim period and those sites which do not qualify have been deleted. The Area was adjusted accordingly.
2.5 Main pressures	Pressures were recorded at each site visited by Cross & Lynn (2013). Only two major pressures are considered to be an issue at the national scale - grazing and invasive alien species. Grazing continues to impact on the biggest Yew Woodland in the Killarney National Park, although the pressure has eased in the recent past. Invasive species occur at all sites but Laurel and Beech have been removed from two of the sites.
2.6 Main threats	Due to the fact that current grazing and invasive species pressures are being addressed these impacts have been downgraded to Medium. Residual impacts are likely to continue into the near future.
2.7.04 Structure and functions - Methods used	5 Yew woodlands were monitored in 2011 (Cross & Lynn, 2013). In each site, 2-4 monitoring plots measuring 20m x 20m were used to gather structure and functions assessment data including indicator species, cover of individual woodland layers, canopy height, presence of non-native species, stand structure and dead wood estimates. One site was assessed as Favourable, 2 as Unfavourable inadequate and 2 as Unfavourable bad. The trend was improving for 3 of the Unfavourable assessements and stable for the remaining site. One of the problems noted for yew woodlands is insufficient regeneration of the shrub layer and target species. The lack of shrub layer and yew regeneration may be traceable back to overgrazing, past or present, or to infestations of invasive species, which have similar effects to overgrazing by suppressing native seedling regeneration.

Field label	Note
Habitat code: 91J0	
2.7.05 Other relevant information	Area of yew woodland = 80.27 ha. Area of yew woodland as QI 79.53 ha Although there is no evidence of decline since the Directive came into force, the current Area is not considered adequate to ensure the long term survival of the habitat. Both favourable reference range and area are very much dependent on suitable habitat, which is very restricted except within the Burren. Favourable Reference Values were set to encompass areas where Yew is present and could be managed to become Yew Woodland. As efforts are being undertaken to restore some of these areas and as grazing pressure is declining within parts of the Burren, the assessments for Range and Area, although Unfavourable Bad, are considered to be improving. The quality of the exisiting Yew Woodlands is still poor due to overgrazing, lack of regeneration and invasive species (Cross & Lynn, 2013). As these issues are being tackled at most sites, Structure & Functions is assessed as Unfavourable bad but improving and Future Prospects as Unfavourable Inadequate improving. Therefore the Overall assessment is Unfavourable Bad improving.
2.8.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Current Range is only 50% of the Favourable Reference Range, therefore Range has been assessed as Unfavourable bad. The FRR is based on the possible increase in the area of yew woodland following Coillte planting and possible natural expansion in the Burren.
2.8.01 b) Range - If CS is U1 or U2 it is recommended to use qualifiers	Restoration that will in time expand the current Range is underway, therefore the qualifier is assessed as improving.
2.8.02 a) Area - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Current Area is only 54% of the Favourable Reference Area, therefore Area has been assessed as Unfavourable bad. The FRA is based on the possible increase in the area of yew woodland following Coillte planting (40 ha excluding Curraghchase which is integrated within the existing area) and natural expansion in the Burren. For the Burren a nominal area of 30 ha has been included bearing in mind that there are over 40 ha of yew woodland in the Killarney National Park on similar but much more restricted terrain. However, this figure should be treated with caution as it may be unrealistically large and could jeopardise a 'favourable' assessment indefinitely.
2.8.02 b) Area - If CS is U1 or U2 it is recommended to use qualifiers	Restoration that will in time expand the current Area is underway, therefore the qualifier is assessed as improving.
2.8.03 a) Specific structures and functions - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	As four out of 5 sites were assessed as Unfavourable with 2 sites Unfavourable bad (Cross & Lynn, 2013) , the Stucture & Functions has bee assessed as Unfavourable Bad.
2.8.03 b) Specific structures and functions - If CS is U1 or U2 it is recommended to use qualifiers	All sites assessed as Unfavourable had an improving trend due to a reduction in grazing pressure and removal of invasive species, therefore the qualifier is assessed as improving.
2.8.04 a) Future prospects - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Future prospects were assessed by noting the pressures, threats and impacts, both positive and negative, occurring throughout the Annex I woodland area. These data were compiled as part of the 2011 field survey (Cross & Lynn, 2013) and following discussions with Coillte. Continued efforts to address grazing pressure and invasive species, together with concerted efforts to expand the area and range of this habitat, has resulted in an assessment of Unfavourable Inadequate. This is an improvement since the 2007 report. It will take time for the quality of the habitat to improve and, in particular, for the newly established areas to become functional Yew Woodland.
2.8.04 b) Future prospects - If CS is U1 or U2 it is recommended to use qualifiers	The qualifier for Future Prospects is improving due to continued positive management intervention.

Field label	Note
Habitat code: 91J0	
2.8.05 Overall assessment of Conservation Status	The field surveys undertaken by Cross & Lynn (2013) plus additional data from 2013 for Kylagowan provided refined figures for Range and Area. Although there is no evidence of decline since the Directive came into force, the current Area is not considered adequate to ensure the long term survival of the habitat. Both favourable reference range and area are very much dependent on suitable habitat, which is very restricted except within the Burren. Favourable Reference Values were set to encompass areas where Yew is present and could be managed to become Yew Woodland. As efforts are being undertaken to restore some of these areas and as grazing pressure is declining within parts of the Burren, the assessments for Range and Area, although Unfavourable Bad, are considered to be improving. The quality of the exisiting Yew Woodlands is still poor due to overgrazing, lack of regeneration and invasive species (Cross & Lynn, 2013). As these issues are being tackled at most sites, Structure & Functions is assessed as Unfavourable bad but improving and Future Prospects as Unfavourable Inadequate improving. Therefore the Overall assessment is Unfavourable Bad improving.
3.1.01 a) Surface area - Minimum	0.8319
3.1.01 b) Surface area - Maximum	0.8319
3.1.03 Trend of surface area within the network	Stable (The area is 2.81 ha smaller than the previous assessment due to inproved knowledge).
3.2 Conservation measures	3.1 A variety of measures have been undertaken to restore and improve the forest habitat. Of the unfavourable sites, those subject to heavy grazing have been fenced and the deer culled heavily. This has improved the condition of the site, although in one area deer trapped within the fence are still causing considerable damage. Removal of beech and laurel at the other 2 unfavourable sites has led to an improvement in their condition, but further thinning of beech is necessary. Planting yew cuttings have been undertaken at these 2 sites in an attempt to expand the woodlands. Planting has also been undertaken at 3 other sites to create new yew woodlands. Yew Woodlands that are listed as qualifying features in SACs are protected by the 2011 Habitat Regulations; this regulates any plans or projects that may negatively impact on the habitat. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Yew Woodland is regulated under the Environment Liability Regulations 2008.

Yew Woodlands (91J0)
Article 17 Assessment 2013



Current Distribution (7 cells)

Current Range (7 cells)

Favourable Reference Range (12 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
30-04-13