National Parks and Wildlife Service

Conservation Objectives Series

Glenamoy Bog Complex SAC 000500



An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs



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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance
- exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

• population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and

• the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and

• there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.

2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.

3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.

4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.

5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

* indicates a priority habitat under the Habitats Directive			
000500	Glenamoy Bog Complex SAC		
1106	Salmon Salmo salar		
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts		
1393	Slender Green Feather-moss Drepanocladus vernicosus		
1395	Petalwort Petalophyllum ralfsii		
1528	Marsh Saxifrage Saxifraga hirculus		
21A0	Machairs (* in Ireland)		
3160	Natural dystrophic lakes and ponds		
4010	Northern Atlantic wet heaths with Ò'ææk^dæk		
5130	R' $\frac{3}{2}$ $^{\prime} \cdot A = A = A = A = A = A = A = A = A = A$		
7130	Blanket bogs (* if active bog)		
7140	Transition mires and quaking bogs		
7150	Depressions on peat substrates of the Rhynchosporion		

Please note that this SAC overlaps with Blacksod Bay/Broad Haven SPA (004037) and Illanmaster SPA (004074) and is adjacent to Broadhaven Bay SAC (000472) and Slieve Fyagh Bog SAC (000542). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	1983		
Title :	Report on the conservation value of Irish coastal sites: Machair in Ireland		
Author :	Bassett, A.		
Series :	Unpublished Report		
Year :	1987		
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I		
Author :	Foss, P.; McGee, E.		
Series :	A report commissioned by the Wildlife Service		
Year :	1989		
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II		
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.		
Series :	A report commissioned by the Wildlife Service		
Year :	1998		
Title :	Biomar survey of Irish machair sites 1996		
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.		
Series :	Irish Wildlife Manual No. 3		
Year :	2009		
Title :	Coastal Monitoring Project 2004-2006		
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.		
Series :	Unpublished report to NPWS		
Year :	2011		
Year : Title :	2011 National survey and assessment of the conservation status of Irish sea cliffs		
Year : Title : Author :	2011 National survey and assessment of the conservation status of Irish sea cliffs Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.		
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Year : Title : Author : Series : Year : Title : Author : Series : Year : Title : Author : Series : Year : Title : Author : Series : Year :	2011National survey and assessment of the conservation status of Irish sea cliffsBarron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.Irish Wildlife Manual No. 532012The conservation status of juniper formations in IrelandCooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.Irish Wildlife Manual No. 632012Ireland Red List No. 8: BryophytesLockhart, N.; Hodgetts, N.; Holyoak, D.Ireland Red List series, NPWS2013Monitoring survey of Annex I sand dune habitats in IrelandDelaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.Irish Wildlife Manual No. 752013		
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Year :	2013			
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments			
Author :	NPWS			
Series :	Conservation assessments			
Year :	2014			
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0			
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.			
Series :	Irish Wildlife Manual No. 79			
Year :	2015			
Title :	Monitoring recommendations for Marsh Saxifrage (Saxifraga hirculus L.) in the Republic of Ireland			
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.			
Series :	Irish Wildlife Manual No. 88			
Year :	2015			
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site- specific conservation objectives and Article 17 reporting			
Author :	O Connor, Á.			
Series :	Unpublished document by NPWS			
Year :	2015			
Title :	Monitoring methods for <i>Petalophyllum ralfsii</i> (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland			
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.			
Series :	Irish Wildlife Manual No. 90			
Year :	2015			
Title :	Monitoring methods for <i>Hamatocaulis vernicosus</i> (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland			
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.			
Series :	Irish Wildlife Manual No. 91			
Year :	2016			
Title :	Ireland Red List No. 10: Vascular Plants			
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.			
Series :	Ireland Red Lists series, NPWS			
Year :	2017			
Title :	Glenamoy Bog Complex SAC (site code: 500) Conservation objectives supporting document- blanket bogs and associated habitats V1			
Author :	NPWS			
Series :	Conservation objectives supporting document			
Year :	2017			
Title :	Glenamoy Bog Complex SAC (site code: 500) Conservation objectives supporting document- coastal habitats V1			
Author :	NPWS			
Series :	Conservation objectives supporting document			

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris

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Year :	1989		
Title :	The genera Scorpidium and Hamatocaulis, gen. nov., in northern Europe		
Author :	Hedenäs, L.		
Series :	Lindbergia, 15: 8-36		
Year :	1990		
Title :	Ecology and conservation of Irish peatlands		
Author :	Doyle, G.J. (Ed.)		
Series :	Royal Irish Academy, Dublin		
Year :	2000		
Title :	Colour in Irish lakes		
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.		
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623		
Year :	2005		
Title :	National inventory of sea cliffs and coastal heaths		
Author :	Browne, A.		
Series :	Unpublished Report to NPWS		
Year :	2006		
Title :	The vegetation of Irish machair		
Author :	Gaynor, K.		
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321		
Year :	2006		
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)		
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.		
Series :	EPA, Wexford		
Year :	2008		
Title :	Water Quality in Ireland 2004-2006		
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.		
Series :	EPA, Wexford		
Year :	2010		
Title :	Water quality in Ireland 2007-2009		
Author :	McGarrigle, M.; Lucey, J.; O Cinnéide, M.		
Series :	EPA, Wexford		
rear:			
Title :	Conservation biology of Saxifraga hirculus L. in Ireland		
Author :	Muldoon, C.S.		
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin		
Year :	2012		
litle :	I he impact of conifer plantation forestry on the ecology of peatland lakes		
Author :	Drinan, T.J.		
Series :	Unpublished Ph.D. thesis, University College Cork		
Year :	2013		
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland		
Author :	Campbell, C.		
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin		

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Year :	2013		
Title :	Interpretation manual of European Union habitats- Eur 28		
Author :	European Commission- DG Environment		
Series :	European Commission		
Year :	2015		
Title :	Water quality in Ireland 2010-2012		
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.		
Series :	EPA, Wexford		
Year :	2016		
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016		
Author :	SSCS (Standing Scientific Committee on Salmon)		
Series :	Independent Scientific Report to Inland Fisheries Ireland		

Spatial data sources

Year :	2011		
Title :	National survey and assessment of the conservation status of Irish sea cliffs		
GIS Operations :	Clipped to SAC boundary		
Used For :	1230 (map 3)		
Year :	2013		
Title :	Sand Dune Monitoring Project 2011. Version 1		
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising		
Used For :	21A0 (map 3)		
Year :	2008		
Year : Title :	2008 OSi 1:5000 IG vector dataset		
Year : Title : GIS Operations :	2008 OSi 1:5000 IG vector dataset WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising		
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1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable, subject to natural processes, including erosion. For the sub-site mapped (Glinsk), total length of cliff sections: 27.93km. See map 3	Based on data from the Irish Sea Cliff Survey (ISCS) (Barron et al., 2011). Cliffs are linear features and are therefore measured in kilometres. The sub-site Glinsk (ISCS site ID: 08005) was identified using a combination of aerial photos and the DCENR helicopter viewer. The length of cliff was measured (in sections) to give a total estimated area of 27.93km within the SAC. The length of cliff is likely to be underestimated. See the Glenamoy Bog Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	Sea cliffs are known to occur along the coastline and extend along the north coast ranging in height from 20m to 253m, at Benwee Head. Hard cliffs have been noted in this SAC and it is estimated that all of the cliffs are of the hard type (Browne, 2005; Barron et al., 2011). See the coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes, including groundwater quality, due to artificial structures	Based on data from Barron et al. (2011). Maintaining natural geomorphological processes, including natural erosion, is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes that can be associated with sea cliffs. Hydrological features such as gullies, streams and cascades were identified by the ISCS as occurring on the cliffs in Glenamoy Bog Complex SAC. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	Based on data from Barron et al. (2011). Cliff top vegetation, which ranges from <i>Plantago</i> -dominated sward to coastal heath and maritime grassland, occurs adjacent to sea cliff vegetation in Glenamoy Bog Complex SAC. See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub- communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub- communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011)	See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details

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21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs (* in Ireland) in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Garter Hill - 234.0ha. See map 3	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Machair habitat was recorded and mapped at the sub-site Garter Hill (SDM site ID: 128) to give a total estimated area of 234.0ha within Glenamoy Bog Complex SAC. See the Glenamoy Bog Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Machair occurs on the western coast of Glenamoy Bog Complex SAC. South of Benwee Head, the rocky coastline grades into an estuarine system which contains the machair system. The machair extends upslope to cover much of Garter Hill (158m) and is the highest recorded in Ireland. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. There are some coastal protection (rock armour) works adjacent to the machair in the SAC, but these do not appear to have caused any change in erosion patterns. See the coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime	Based on data from Bassett (1983), Crawford et al. (1998), Gaynor (2006), Ryle et al. (2009) and Delaney et al. (2013). There are a number of streams and flushes that run through the machair edged by wet vegetation, which add to the diversity of species and help to retain the blowing sand. Several seeps and streams are present and tufa deposits have developed in some places. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). A series of fixed dune ridges (up to 1.5m) and mobile dunes front the seaward side of the machair with low-lying ridges in the transition from fixed dune to machair. This particular machair is unusual in that it extends up from the sand dune system onto the slopes of Garter Hill, grading into heath and wet grassland at the top of the hill. Agricultural fields flank the east and western edges of the machair. See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of machair habitat, subject to natural processes	Severe erosion was recorded in the 1996 machair survey (Crawford et al., 1998) and the site was regarded as a poor example of machair. It is likely that the quality of the habitat has declined even further as unsustainable grazing pressure and erosion persist on the commonage. The impacts of overgrazing have exacerbated the natural erosion with large areas of bare sand present in the transitional area between the fixed dune and machair habitats. The SDM concluded that overgrazing remains a problem, but is less severe than it was previously (Delaney et al., 2013). See the coastal habitats supporting document for further details

Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). The sward is closely-cropped (2-5cm) due to the persistent overgrazing of this habitat over a long period of time and bare sand covers large areas. In the area of recovering machair, the average sward height was 2.06cm. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub- communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub- communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2006), Ryle et al. (2009) and Delaney et al. (2013). The typical machair species diversity is poor in this SAC. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009) and Delaney et al. (2013). The machair contains abundant mosses including <i>Bryum pseudotriquetrum</i> , <i>Calliergonella cuspidata, Homalothecium lutescens,</i> <i>Rhytidiadelphus squarrosus</i> and <i>Syntrichia ruralis</i> subsp. <i>ruraliformis</i> . The Near Threatened moss <i>Catoscopium nigritum</i> (Lockhart et al., 2012), which is also listed on the Flora (Protection) Order, 2015 (FPO), is associated with flushed machair at Garter Hill. Petalwort (<i>Petalophyllum ralfsii</i>), a liverwort species listed on Annex II of the EU Habitats Directive and on the FPO, has been recorded on machair in this SAC (Campbell et al., 2015). See the conservation objective for petalwort (1395) and the coastal habitats supporting document for further details

3160 Natural dystrophic lakes and ponds

To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The blanket bog in Glenamoy Bog Complex SAC has very well-developed pool systems and some deep, open lakes. Lake habitat 3160 is likely to occur in all pools and lakes, including the largest, Lougherglass (38.9ha). Although there are more than 2,100 lake/pool polygons, not all pools are mapped in the 1:5,000 OSi data (see map 4). All lakes and pools are considered to be potential 3160. The habitat is of high conservation value in the SAC. For further information on the distribution, vegetation and morphology of the habitat in the SAC, see Foss and McGee (1987) and Douglas et al. (1989). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the habitat is widespread and of high conservation value in the SAC (see map 4). All lake/pond polygons have been mapped as potential 3160
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see the Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015). Douglas et al. (1989) state larger pools at Glenamoy chiefly contain pipewort (<i>Eriocaulon aquaticum</i>), a Near Threatened species in Ireland (Wyse Jackson et al., 2016), with water lobelia (<i>Lobelia dortmanna</i>), lesser bladderwort (<i>Utricularia minor</i>), bogbean (<i>Menyanthes trifoliata</i>) and the bog mosses <i>Sphagnum auriculatum</i> and <i>S. cuspidatum</i> as frequent associates. Ungrazed island hummocks, with crowberry (<i>Empetrum nigrum</i>) and juniper (<i>Juniperus communis</i>), are frequent features of larger pools
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3160 (see O Connor, 2015). Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3160. 3160 lakes and pools naturally have very clear water and, therefore, maximum depth can be large

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. The hydrological regime of 3160 lakes and pools is integrally linked to that of the surrounding blanket bog, transition mire/quaking bog and other peatland habitats. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3160 (O Connor, 2015). Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of \geq 12m annual mean Secchi disk depth, and \geq 6m annual minimum Secchi disk depth
Water quality: nutrients	μg/l Ρ; mg/l Ν	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For 3160 lakes and pools, annual average total phosphorus (TP) concentration should be $\leq 5\mu g/I$ TP, average annual total ammonia concentration should be ≤ 0.040 mg/I N and annual 95th percentile for total ammonia should be ≤ 0.090 mg/I N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	μg/l Chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll <i>a</i> concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for lake habitat 3160: annual average chlorophyll <i>a</i> concentration <1µg/l and annual peak chlorophyll <i>a</i> concentration $\leq 2.5µg/l$. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status

Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3160 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for 3160 lakes and pools is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of \geq 0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. Although European Commission (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for lake habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and pools where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/I SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes

Fringing habitat: Hectares area

Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160 3160 lakes and pools intergrade with blanket bog and heath communities in this SAC, often with transition mire/quaking bog at the interface. These habitats support the structure and functions of the lake habitat. Equally, the fringing habitats are also dependent on the lake/pool, particularly its water levels, and can support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Northern Atlantic wet heaths with <i>Erica tetralix</i> has not been mapped in detail for Glenamoy Bog Complex SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 723ha, covering 6% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Glenamoy Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur on hillsides within the SAC (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of wet heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of monitoring stops	Cross-leaved heath (<i>Erica tetralix</i>) present within a 20m radius of each monitoring stop	Attribute and target based on Perrin et al. (2014)
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of <i>Cladonia</i> and <i>Sphagnum</i> species, <i>Racomitrium lanuginosum</i> and pleurocarpous mosses at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (<i>Empetrum</i> <i>nigrum</i>) at least 15%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non- native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (<i>Pteridium aquilinum</i>) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (<i>Juncus effusus</i>) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry (<i>Empetrum nigrum</i>) and bog-myrtle (<i>Myrica gale</i>) showing signs of browsing	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

5130

Juniperus communis formations on heaths or calcareous grasslands

To maintain the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Occurrence	Area stable or increasing, subject to natural processes	<i>Juniperus communis</i> formations on heath or calcareous grasslands has not been surveyed in detail in Glenamoy Bog Complex SAC and thus the total area of the qualifying habitat is unknown. Douglas et al. (1989) noted juniper <i>Juniperus</i> <i>communis</i> as being fairly widespread throughout the blanket bog habitat (7130*), particularly at pool margins and on islands within pool lakes. It also occurs on the coastal fringe and grades into heath and grassland communities in places
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Juniper population size	Number per formation	At least 50 plants per formation	To classify as a juniper (<i>Juniperus communis</i>) formation, at least 50 plants should be present (Cooper et al., 2012)
Vegetation composition: typical species	Number per formation	At least 50% of the listed positive indicator species for the relevant vegetation group present	Attribute and target based on Cooper et al. (2012), where positive indicator species for five vegetation groups are listed
Vegetation composition: negative indicator species	Occurrence per formation	Negative indicator species, particularly non-native invasive species, absent or under control	Attribute and target based on Cooper et al. (2012), where the list of negative indicator species is presented
Vegetation structure: cone- bearing plants	Percentage per formation	At least 10% of juniper plants are bearing cones	Attribute and target based on Cooper et al. (2012)
Vegetation structure: seedling recruitment	Percentage per formation	At least 10% of juniper plants are seedlings	Attribute and target based on Cooper et al. (2012)
Vegetation structure: dead juniper	Percentage per formation	Mean percentage of each juniper plant dead less than 10%	Attribute and target based on Cooper et al. (2012)

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs (* if active bog) in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Glenamoy Bog Complex SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 6,749ha, covering 52% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Glenamoy Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Blanket bog habitat occupies the gentle undulating plain that dominates the central areas of this SAC. It also extends uphill to cover the slopes of Maumakeogh and Benmore in the eastern sector of the SAC, and northward, out toward the sea cliffs of the north-west Mayo coastline (NPWS internal files). Important peatland sites within the SAC include Glenamoy Bog, Rathavisteen Bog, Maumkeogh Bog and Glencalry Bog. Further information can be found in Foss and McGee (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Foss and McGee, 1987; Douglas et al., 1989; NPWS internal files), five of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding <i>Sphagnum fallax</i> , at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented

Vegetation composition: non- native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (<i>Empetrum</i> <i>nigrum</i>) and bog-myrtle (<i>Myrica gale</i>) showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: erosion	Percentage area in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

7140 Transition mires and quaking bogs

To restore the favourable conservation condition of Transition mires and quaking bogs in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Transition mires and quaking bogs have not been mapped in detail for Glenamoy Bog Complex SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Glenamoy Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur in areas where bog vegetation and base-rich flushes merge, and also at the interface between large pools/lakes and adjacent bog (NPWS internal files). Examples of this habitat can be found at Glenamoy Bog, Rathavisteen Bog and Glencalry Bog (Foss and McGee, 1987; Douglas et al., 1989; R. Hodd, pers. comm.). Further information can be found in Foss and McGee (1987), Douglas et al. (1989) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Foss and McGee (1987), Douglas et al. (1989) and R. Hodd (pers. comm.) recorded a variety of transition mire vegetation communities in this SAC, two of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least three for infilling pools and flushes and at least six for fens	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: number of core positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least one core positive indicator species present	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of positive indicator species is at least 25%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non- native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples of the habitat, not to infilling pool examples

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Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Annex II listed, FPO listed and Near Threatened slender green feather-moss (<i>Hamatocaulis</i> (<i>Drepanocladus</i>) <i>vernicosus</i>) and the Vulnerable <i>Tomentypnum nitens</i> (Lockhart et al., 2012) are known to occur within the SAC (Foss and McGee, 1987; Campbell et al., 2015; NPWS internal files), although the latter species cannot be specifically assigned to this habitat. See also the conservation objective for slender green feather-moss (1393)

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Depressions on peat substrates of the Rhynchosporion

To restore the favourable conservation condition of Depressions on peat substrates of the Rhynchosporion in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Glenamoy Bog Complex SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Glenamoy Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	This habitat is typically confined to relatively small areas but is best represented around pool margins and in wet hollows in the SAC (NPWS internal files). Examples of this habitat can be found at Glenamoy Bog (Douglas et al., 1989). Further information can be found within Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: <i>Rhynchospora</i> spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (<i>Rhynchospora alba</i>) and brown beaked sedge (<i>R.</i> <i>fusca</i>) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non- native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (<i>Empetrum</i> <i>nigrum</i>) and bog-myrtle (<i>Myrica gale</i>) showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)

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Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: erosion	Percentage area in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened brown beak-sedge (<i>Rhynchospora</i> <i>fusca</i>) (Wyse Jackson et al., 2016) was recorded in this habitat by Doyle (1990)

1106 Salmon *Salmo salar*

To restore the favourable conservation condition of Atlantic Salmon in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long- term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Glenamoy River is currently below CL, meeting 87% of CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (<i>Lepeophtheirus salmonis</i>)
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

To maintain the favourable conservation condition of Slender Green Feather-moss (Shining Sickle-moss) in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No decline, subject to natural processes. See map 5 for known location at Rathavisteen	(Please note that <i>Drepanocladus vernicosus</i> was reclassified as <i>Hamatocaulis vernicosus</i> by Hedenäs (1989)). The known population of slender green feather-moss (<i>Hamatocaulis vernicosus</i>) in Glenamoy Bog Complex SAC is at Rathavisteen, where it occurs at the bases of tussocky vegetation on the upper eastern margin of a marsh/fen which is a floating scragh. Data from NPWS survey by Neil Lockhart in 1999 (NPWS internal files). See also Campbell et al. (2015)
Population size	Number of individuals	No decline, subject to natural processes	The density was estimated by Lockhart in 1999 to be c.100 shoots per square metre, giving a shoot count of c.1000 shoots (NPWS internal files). See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The full extent of suitable habitat in Glenamoy Bog Complex SAC is unknown. A small patch (c.10m x 1m, i.e. 0.001ha), was recorded in Rathavisteen by Lockhart in 1999 (NPWS internal files). See Campbell et al. (2015) for further details
Hydrological conditions: water table level	Metres	Maintain suitable hydrological conditions	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) is mostly confined to mesotrophic fens, a transitional habitat between acid bog and baserich fen. This appears to occur in at least two forms in Ireland: upland transitional flushes, where the plants can occur in lawns that rise and fall with fluctuating water table levels, such as at Rathavisteen; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation composition: tree cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage tree cover should be less than 15%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage shrub cover should be less than 20%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. See Campbell et al. (2015) for further details
Vegetation composition: grass cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage grass species cover should be less than 25%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of grasses, maintained by a low grazing intensity by cattle at Rathavisteen. See Campbell et al. (2015) for further details
Vegetation composition: bryophyte cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage bryophyte cover should be more than 50%	The part of the marsh/fen at Rathavisteen where slender green feather-moss (<i>Hamatocaulis</i> <i>vernicosus</i>) occurs is a floating scragh, dominated mostly by <i>Sphagnum</i> spp. with lenses of tussocky sedges and grasses when surveyed by Lockhart in 1999 (NPWS internal files). See also Campbell et al. (2015)
Vegetation composition: cover of <i>Calliergonella</i> <i>cuspidata</i>	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of <i>Calliergonella cuspidata</i> should be less than 15%	<i>Calliergonella cuspidata</i> , a moss species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. See Campbell et al. (2015) for further details
Vegetation structure: vegetation height	Centimetres in a representative number 2m x 2m monitoring plots	Mean vegetation height should not exceed 40cm	See Campbell et al. (2015) for further details

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1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No decline, subject to natural processes. See map 5 for recorded locations	The known population of petalwort (<i>Petalophyllum ralfsii</i>) in Glenamoy Bog Complex SAC is at Garter Hill, where it occurs on banks of water tracks and also on the sides of low sandhills in wetter flushed parts of the machair. Data from NPWS surveys (NPWS internal files) and Campbell (2013). See also Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The area of occupancy, estimated from polygons drawn around GPS co-ordinates taken from NPWS surveys and Campbell (2013), was 211,604m ² . However, only about 70% of this area is actually suitable habitat for petalwort (<i>Petalophyllum ralfsii</i>), which is 148,123m ² , i.e. c.14.8ha. See Campbell et al. (2015) for further details
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that the substrate is kept moist and damp throughout the year, but is not subject to prolonged inundation by flooding in winter	Petalwort (<i>Petalophyllum ralfsii</i>) grows on damp sandy substrate. Based on Campbell (2013) and Campbell et al. (2015)
Hydrological conditions: water table level	Centimetres in a representative number of 1m x 1m monitoring plots	Mean groundwater level should not be more than 80cm from ground surface	See Campbell et al. (2015) for further details
Physical structure: bare soil	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage cover of bare soil should be more than 5%	At Garter Hill, petalwort (<i>Petalophyllum ralfsii</i>) grows in compacted, sandy ground. See Campbell et al. (2015) for further details
Vegetation structure: vegetation height	Centimetres in a representative number of 1m x 1m monitoring plots	Mean vegetation height should be less than 6cm	At Garter Hill, petalwort (<i>Petalophyllum ralfsii</i>) habitat is maintained by rabbit (<i>Oryctolagus</i> <i>cuniculus</i>) and sheep grazing and some trampling. Campbell (2013) recorded a mean height of vegetation of 3cm at Garter Hill. See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage shrub cover should be less than 25%	See Campbell et al. (2015) for further details
Vegetation composition: grass cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage grass species cover should be less than 60%	See Campbell et al. (2015) for further details

1528 Marsh Saxifrage *Saxifraga hirculus*

To maintain the favourable conservation condition of Marsh Saxifrage in Glenamoy Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No loss in geographical spread and number of populations, subject to natural processes. See map 6 for 1km grid square locations	The two known populations of marsh saxifrage (<i>Saxifraga hirculus</i>) in Glenamoy Bog Complex SAC occur at Barroosky and Aghoo. See Muldoon (2011) and Muldoon et al. (2015) for further details
Population size: number of rosettes	Number	Maintain the size of the known populations, subject to natural processes. The target numbers of rosettes are: at least 52,000 at Barroosky and at least 960 at Aghoo	The number of rosettes recorded by Muldoon (2011) were: 65,000 at Barroosky and 1,200 at Aghoo. The target figures are a 20% reduction of the recorded numbers to allow for a margin of error and variability over monitoring seasons. See Muldoon et al. (2015) for further details
Population size: area of occupancy	Hectares	Maintain the area of occupancy of the known populations, subject to natural processes. The target areas are: at least 0.2025ha at Barroosky and at least 0.017ha at Aghoo	The areas of occupancy estimated by Muldoon (2011) were: 2,250m ² (0.2250ha) at Barroosky and at 189m ² (0.019ha) at Aghoo. The target area figures are a 10% reduction of the recorded areas to allow for a margin of error. See Muldoon et al. (2015) for further details
Hydrological conditions: water level	Occurrence of high or fluctuating water levels	Maintain the appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, marsh saxifrage (<i>Saxifraga hirculus</i>) is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation composition: positive indicator species	Occurrence in a representative number of 1m x 1m monitoring stops	Knotted pearlwort (<i>Sagina</i> <i>nodosa</i>) should be present in at least two of five 1m x 1m monitoring stops	The presence of the positive indicator species knotted pearlwort (<i>Sagina nodosa</i>) should be maintained (Muldoon, 2011; Muldoon et al., 2015)
Vegetation composition: negative indicator species	Mean percentage cover in five 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (<i>Molinia</i> <i>caerulea</i>) should not exceed 5%; mean percentage cover of Yorkshire fog (<i>Holcus</i> <i>lanatus</i>) should not exceed 15%	Low cover of the negative indicator species purple moor-grass (<i>Molinia caerulea</i>) and Yorkshire fog (<i>Holcus lanatus</i>) should be maintained. Part of the surrounding bog at the Barroosky site has been reclaimed for low grade agricultural use. No improvements (e.g. fertilizer inputs) should be carried out on the site. Monitoring of purple moor- grass levels in particular is recommended at Barroosky. See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: sward height	Centimetres	Maintain a mean vegetation height of less than 15cm	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing level	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	The surrounding bog at the flush at Barroosky is overgrazed with high levels of poaching. Low grazing was identified as an issue at Aghoo. See Muldoon (2011) and Muldoon et al. (2015) for further details







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	Department of Arts, Herita Regional, Rural and Gaelta



Legend 1528 Marsh saxifrage Saxifraga hirculus Glenamoy Bog Complex SAC 000500 OSi Discovery Series County Boundary			
An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs Man to be read in conjunction with th	MAP 6: OG COMPLEX SAC TION OBJECTIVES SAXIFRAGE	SITE CODE: SAC 000500; version 3.01. CO. MAYO 0 0.9 1.8 2.7 3.6 4.5 km	The mapped boundaries are of an indicative and general nature only. Bound Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar comharthaithe. Suirbhéarachta Ordonáis na h



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