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Conservation Objectives Series

Slyne Head Peninsula SAC 002074

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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***

002074	Slyne Head Peninsula SAC
1150	Coastal lagoons*
1160	Large shallow inlets and bays
1170	Reefs
1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1395	Petalwort *Petalophyllum ralfsii*
1410	Mediterranean salt meadows (Juncetalia maritimi)
1833	Slender Naiad *Najas flexilis*
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
21A0	Machairs (* in Ireland)
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
4030	European dry heaths
5130	*Juniperus communis* formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
6510	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)
7230	Alkaline fens

Please note that this SAC overlaps with Slyne Head to Ardmore Point Islands SPA (004159). It adjoins Slyne Head Islands SAC (000328) and West Connaught Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for 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 :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1996
Title :	Biomar survey of Irish machair sites
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	1999
Title :	National Shingle Beach Survey of Ireland 1999
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
Year :	2006
Title :	Surveys of sensitive subtidal benthic communities
Author :	MERC
Series :	Unpublished Report to NPWS
Year :	2007
Title :	Inventory of Irish coastal lagoons (version 2)
Author :	Oliver, G.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2012
Title :	The Conservation Status of Juniper Formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70

Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats 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 :	Slyne Head Peninsula SAC (site code: 2074) Conservation objectives supporting document-coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Slyne Head Peninsula SAC (site code: 2074) Conservation objectives supporting document-coastal lagoons V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Slyne Head Peninsula SAC (site code: 2074) Conservation objectives supporting document-marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Slyne Head Peninsula SAC (site code: 2074) Conservation objectives supporting document-*Najas flexilis* V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1979
Title :	The influence of the sea and of parent material on wetlands and blanket bog in west Connemara, Ireland
Author :	van Groenendael, J.M.; Hochstenbach, S.M.H.; van Mansfeld, M.J.M.; Roozen, A.J.M.
Series :	Department of Geobotany, Catholic University, Nijmegen
Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	1982
Title :	The influence of the sea on the vegetation of lakes in southwest Connemara
Author :	van Groenendael, J.M.; Hochstenbach, S.M.H.; van Mansfeld, M.J.M.; Roozen, A.J.M.; Westhoff, V.
Series :	Studies on Irish Vegetation. J. White (Ed.). J. Life Sci. R. Dubli. Soc. 3: 221-242

Year :	1983
Title :	Soligenous influences on wetlands and blanket bog in western Connemara, Ireland. J. Life Sci. R. Dubli. Soc. 4: 129-137
Author :	van Groenendael, J.M.; Hochstenbach, S.M.H.; van Mansfeld, M.J.M.; Roozen, A.J.M.
Series :	J. Life Sci. R. Dubli. Soc. 4: 129-137
Year :	1993
Title :	Vegetation succession in lakes in the coastal fringe of West Connemara, Ireland
Author :	van Groenendael, J.M.; van Mansfeld, M.J.M.; Roozen, A.J.M.; Westhoff, V.
Series :	Aquatic Conservation: Marine and Freshwater Systems 3: 25-41
Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	1999
Title :	A survey of the sublittoral vegetation of 15 machair loughs in north west Ireland/ A survey of coastal lakes in Counties Galway, Mayo, Sligo and Donegal/ A survey of Irish machair loughs
Author :	Roden, C.
Series :	Report to the National Heritage Council, Kilkenny
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 :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
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 :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin

Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems 19 (3): 264–273
Year :	2011
Title :	Reef investigations in Mannin Bay (Slyne Head Peninsula cSAC - Site Code: IE002074) Co. Galway
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2011
Title :	Subtidal benthic investigations in Mannin Bay (Slyne Head Peninsula cSAC - Site Code: IE002074) Co. Galway
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	Intertidal benthic survey and intertidal reef survey of Slyne Head Peninsula SAC and Slyne Head Peninsula SPA
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	Subtidal sediment and subtidal reef survey of Slyne Head Peninsula SAC and Slyne Head Peninsula SPA
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
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
Year :	2013
Title :	Monitoring and assessment of Irish lagoons for the purposes of the EU Water Framework Directive, 2009-2011. Parts 1 and 2
Author :	Roden, C.M; Oliver, G.A.
Series :	Unpublished report to the Environmental Protection Agency
Year :	in prep.
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, A.
Series :	Unpublished report to NPWS
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 3)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 4)
Year :	Interpolated 2014
Title :	1994, 1995 BioMar surveys; 2011 intertidal survey; 2006, 2010, 2011 subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used to resolve any issues arising
Used For :	1170, marine community types (maps 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 6)
Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1330, 1410 (map 7)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	1210, 1220, 2110, 2120, 21A0 (map 8)
Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	1210, 1220, 2110, 2120, 21A0 (map 8)
Year :	Revision 2012
Title :	National Shingle Beach Survey
GIS Operations :	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220 (map 8)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve as necessary any issues arising
Used For :	3110, 3140 (map 9)
Year :	2012
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 10)

Year :	2013
Title :	*Najas flexilis* data
GIS Operations :	Lake habitat for species clipped to SAC boundary
Used For :	1833 (map 11)

1150 Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in Slyne Head Peninsula SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 22.30ha. See map 3	Areas calculated from spatial data derived from Oliver, 2007; Site codes IL067 (Ballyconneely Lake) and IL068 (Lough Athola). See lagoons supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for mapped lagoons	Sites IL067 and IL068 in Oliver (2007). See lagoons supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	In Ballyconneely Lake, salinity was recorded as less than 1psu; while most of Lough Athola was 33-34psu except in a small bay to its western end where it was as low as 6psu. See lagoons supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Maximum depth of both lagoons in the SAC is recorded as 2m or less. See lagoons supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	Ballyconneely Lake has an artificial sluiced outlet running under the road into Ballyconneely Bay; in dry summers it almost completely dries out. Sea water enters Lough Athola on most tides. See lagoons supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges 0.1mg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L.	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoons	Where a lagoon is less than 2m deep, it is expected that macrophyte colonisation would extend to the full depth. See lagoons supporting document for further details
Typical plant species	Number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of unnatural encroachment by reedbeds. See lagoons supporting document for further details

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Slyne Head Peninsula SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 1540ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated and Maërl-dominated community complexes, subject to natural processes. See map 6	Based on a dive survey undertaken in 2006 (MERC, 2006). See marine supporting document for further details
Community structure: *Zostera* density	Shoots per m²	Conserve the high quality of the *Zostera*-dominated community complex, subject to natural processes	Based on 2006 diver observation and underwater viewer (MERC, 2006). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the Maërl-dominated community complex, subject to natural processes	Based on 2006 diver observation and underwater viewer (MERC, 2006). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with Enchytraeidae community complex; Mobile intertidal sand with polychaetes community complex; Subtidal sand with polychaetes and bivalves community complex; Subtidal sand with *Kurtiella bidentata* community complex; Intertidal reef community complex; *Laminaria*-dominated community complex. See map 6	Based on data from BioMar surveys in 1994 and 1995 (Picton and Costello, 1997); intertidal survey in 2011 (MERC, 2012) and subtidal surveys in 2010 and 2011 (Aquafact, 2011; MERC, 2012). See marine supporting document for further details

1170 Reefs

To maintain the favourable conservation condition of Reefs in Slyne Head Peninsula SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area estimated as 571ha based on data from BioMar surveys in 1994 and 1995 (Picton and Costello, 1997); intertidal survey in 2011 (MERC, 2012) and subtidal surveys in 2010 and 2011 (Aquafact, 2011; MERC, 2012)
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on data from BioMar surveys in 1994 and 1995 (Picton and Costello, 1997); intertidal survey in 2011 (MERC, 2012) and subtidal surveys in 2010 and 2011 (Aquafact, 2011; MERC, 2012)
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; *Laminaria*-dominated community complex. See map 6	Based on data from BioMar surveys in 1994 and 1995 (Picton and Costello, 1997); intertidal survey in 2011 (MERC, 2012) and subtidal surveys in 2010 and 2011 (Aquafact, 2011; MERC, 2012). See marine supporting document for further details

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of drift lines in Slyne Head Peninsula 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 sub-sites mapped: Ballyconneely - 0.50ha; Aillebrack - 0.28ha. See map 8	Based on data from the Coastal Monitoring Project (Ryle et al. 2009) and Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). This habitat is very difficult to measure in view of its dynamic nature which means that it can appear and disappear within a site from year to year. It was recorded at at two sub-sites, giving a total estimated area of 0.78ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Strandline fragmented at both sites and is most extensive at Ballyconeely. See 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). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. The absence of significant foredune develoment at most sites indicates that sediment depletion is a factor in the functioning of the coastal ecosystem. See 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). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and orache (*Atriplex* spp.)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Slyne Head Peninsula 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	Current area unknown. Vegetated shingle was recorded at two sub-sites during the Coastal Monitoring Project (Ryle et al., 2009), at Doonloughan (0.032ha) and Ballyconneely (0.034ha). The Sand Dunes Monitoring Project (SDM) however failed to relocate the habitat at Doonloughan (Delaney et al, 2013). See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for mapped location	Current distribution unknown. Small areas of shingle vegetation recorded at Doonloughan and Ballyconeely (Ryle et al., 2009). Likely to be more widespread. See 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	Shingle features are relatively stable in the long term. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Slyne Head Peninsula 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 sub-site mapped: Erriseask - 1.47ha. See map 7	Based on data from Saltmarsh monitoring Project (SMP) (McCorry and Ryle, 2009). One sub-site that supports Atlantic Salt Meadows was mapped (1.47ha) and additional areas of potential ASM habitat (2.59ha) were identified from an examination of aerial photographs, giving a total estimated area of 4.06ha. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from McCorry and Ryle (2009). Naturally induced erosion is not an issue at Erriseask owing to its sheltered location. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks and pan structures in ASM at Erriseask are poorly developed as is typical of the fragmented nature of the habitat. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). Most of the saltmarsh is grazed by cattle. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated	Based on data from McCorry and Ryle (2009). The ASM at Erriseask is damaged by poaching in places. See 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 SMP (McCorry and Ryle, 2009)	Based on data from McCorry and Ryle (2009). Turf fucoids occur at Erriseask and are species of local distinctiveness. See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	Common cordgrass (*Spartina anglica*) has not been recorded in this SAC and its establishment should be prevented	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

1410 Mediterranean salt meadows (Juncetalia maritimi)

To restore the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Slyne Head Peninsula 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 sub-site mapped: Erriseask - 4.52ha. See map 7	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). One sub-site that support Mediterranean Salt Meadow was mapped (4.52ha) and additional areas of potential MSM habitat (2.01ha) were identified from an examination of aerial photographs, giving a total estimated area of 6.53ha. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7 for known distribution	Based on data from McCorry and Ryle (2009). MSM is the dominant saltmarsh type. Naturally induced erosion is not an issue at Erriseask owing to its sheltered location. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). There are no indications of any loss of habitat due to erosion or land use changes in MSM at Erriseask. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). The MSM at Erriseask has a well-developed saltmarsh structure in places. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). Mediterranean salt meadows is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry and Ryle (2009). Most of the saltmarsh is grazed by cattle. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). Some of the MSM at Erriseask is damaged by poaching. See 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 characteristic species listed in SMP (McCorry and Ryle, 2009)	Based on data from McCorry and Ryle (2009). Turf fucoids occur at Erriseask and are species of local distinctiveness. See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	Common cordgrass (*Spartina anglica*) has not been recorded in this SAC and its establishment should be prevented	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in Slyne Head Peninsula 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 sub-sites mapped: Ballyconneely- 0.10ha; Aillebrack - 0.45ha; Doonloughan - 0.61ha; Mannin Bay - 1.36ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). This habitat is very difficult to measure in view of its dynamic nature and was recorded at all four sub-sites, giving a total estimated area of 2.52ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See 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). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. Sand extraction was noted from Doonloughan, Aillebrack and Mannin Bay. The golf course adjacent to Aillebrack sub-site have erected rock filled gabions to curb the effects of coastal erosion. See 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). See coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch grass (*Elytrigia juncea*) and/or lyme grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch grass (*Elytrigia juncea*) and/or lyme grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See 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. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Slyne Head Peninsula 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 sub-site mapped: Ballyconneely - 0.15ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat mapped at one sub-site to give a total estimated area of 0.15ha. Habitat was recorded at Aillebrack during the CMP but due to its highly dynamic nature it was absent during the SDM. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See 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). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. Sand extraction was noted from Aillebrack. See 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 Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) 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. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs in Slyne Head Peninsula 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 sub-sites mapped: Ballyconneely - 15.61ha; Aillbrack - 73.56ha; Doonloughan - 113.27ha; Mannin Bay - 73.85ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was recorded from four sub-sites, giving a total estimated area of 276.29ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Machair is the most abundant dune habitat in the SAC. The largest machair site is at Doonloughan which has lost some habitat area due to natural events. Machair habitat loss was also noted from Aillebrack. See 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. Sand extraction has been noted from Aillebrack, Doonloughan and Mannin Bay. See coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations	Maintain natural hydrological regime	Based on data from Ryle et al. (2009), Delaney et al. (2013), Crawford et al. (1996) and Gaynor (2006). See 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 range of coastal habitats have been identified at this site by the CMP and SMP. See 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	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See 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 Ryle et al. (2009), Delaney et al. (2013) and Gaynor (2006). Slyne Head supports the largest population nationally and internationally of the Annex II liverwort petalwort (*Petalophyllum ralfsii*). See the conservation objective for petalwort (1395) and the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) 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 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). High bryophyte cover was noted by the CMP at Aillebrack and Doonloughan. See coastal habitats supporting document for further details

3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

To maintain the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) in Slyne Head Peninsula 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 distribution and classification of lake habitats in the c.29 lakes/ponds in the SAC is not fully known and, therefore, habitat area targets cannot be set. 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. van Groenendael et al. (1979) mapped vegetation in Silverhill Lough, Aillebrack South and North, Emlagharan Lough, Lough Derreen, Lough Antony, Lough Anaserd and Truska Lough using physiognomic, structural and floristic characteristics. The authors also classified the vegetation using the phytosociological techniques of the Zürich-Montpellier school (Braun-Blanquet system). However, the linkages between their vegetation units and Annex I habitats have not been established. 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, in prep.)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 9 for indicative lake habitat distribution	The selection of the SAC for habitat 3110 was based on data on Lough Anaserd and Lough Truska (van Groenendael et al., 1979, 1982, 1993). Re-examination of these data, EPA monitoring of Lough Anaserd and the occurrence of *Najas flexilis* in Lough Anaserd suggest however that their vegetation is more closely aligned to habitat 3130. It is possible, that habitat 3110 occurs elsewhere within the SAC, e.g. Manninmore Lough, Lough Usk; however, the influences of the sea and, more particularly, wind-blown sand mean it is unlikely that typical oligotrophic examples exist. See van Groenendael et al. (1979, 1982, 1983, 1993), Crawford et al. (1998), Roden (1999) and Roden and Murphy (in prep.) for more information on the influences of the sea and sand on lakes in the SAC
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for 3110 (NPWS, 2013) and O Connor (in prep.)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.). However, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other lake habitats
Vegetation distribution: maximum depth	Metres	No change to maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target of more than 6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time

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 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
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 the oligotrophic soft water habitat is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. An association with highly organic fines is probably quite common. Substratum particle size is likely to vary with depth and along the shoreline within a single lake
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. A target has been set for hard water lakes (3140), however targets have yet to be established for the remaining lake habitats. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P or mg/l N	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	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 the oligotrophic soft water lake habitat, annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090 mg/l N. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg l-1 Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to the oligotrophic soft water habitat (3110). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8 µg/l. The annual average chlorophyll a concentration should be <2.5 µg/l and the annual peak chlorophyll *a* concentration should be <8.0 µg/l. For further information see 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 EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 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 the oligotrophic soft water habitat 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, habitat 3110 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 the oligotrophic soft water lake habitat is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥ 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. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For oligotrophic soft water lakes (3110), and adopting a precautionary approach based on Arts (2002), minimum pH should not be <5.5. Maximum pH should be <9.0, in line with the surface water standards established for soft waters (where water hardness is ≤100 mg/l CaCO3). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
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 38 mg/l PtCo (Free, et al., 2000) and 33 mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50 mg/l PtCo. Water colour can be very low (<20 mg/l PtCo or even <10 mg/l PtCo) in oligotrophic soft water lakes (3110), 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 factors such as shading and competition

Turbidity	nephelometric turbidity units/ mg/l 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 area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet-woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.

To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Slyne Head Peninsula 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 hard water lake habitat (3140) is found in Doon Lough and Aillebrack Loughs South and North. It is likely to be more widespread in the SAC, given the prevalence of calcareous sand. Two measures of extent should be used: 1. the area of the lake itself; 2. the extent of the vegetation communities/zones that typify the habitat. The vegetation of Aillebrack South was mapped by van Groenendael et al. (1979) and Crawford et al. (1998). Further data on the extent of the vegetation in Aillebrack South can be found in Roden (1999) and Roden and Murphy (in prep.). van Groenendael et al. (1979) also mapped vegetation in Aillebrack North. It should be noted, however, that linkages between vegetation units recorded by the Dutch ecologists and Annex I lake habitats have not been established. 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, in prep.)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 9 for indicative lake habitat distribution	Doon Lough was surveyed by Heuff (1984) and by N.F. Stewart and C.D. Preston for the aquatic plants atlas (Preston and Croft, 2001). Aillebrack South was surveyed by Crawford et al. (1998), Roden (1999) and Roden and Murphy (in prep.) and contains the machair form of habitat 3140. The machair form is shallower, has cloudier water and is probably naturally more productive than typical hard water forms. It is likely that the machair form of habitat 3140 inter-grades with, or is related to, lake habitats 3150 and 3130. More research is needed to characterise coastal lakes and the inter-relationships of lake habitats 3130, 3140 and 3150 within them
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical species (cyanobacteria, algae, higher plants and water beetles), see Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor,in prep.). The machair form of the hard water lake habitat (3140) differs from more typical forms by having characteristic plants such as *Ranunculus baudotii* and *Potamogeton pectinatus*. Aillebrack South has a compressed zonation of *Chara aspera* and *Chara curta* in shallow water, with intermixed *Chara rudis* and *Chara globularis/virgata* at depths of 1-4m (Roden and Murphy, in prep.). Angiosperms are scarce, as in more typical forms of habitat 3140 (Roden and Murphy, in prep.)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.). The zonation in machair forms of habitat 3140 differs from that of the clearer water forms (Roden and Murphy, in prep.). Aillebrack South has a compressed zonation of krustenstein, *Chara aspera* and *Chara curta* in shallow water, and intermixed *Chara rudis* and *Chara globularis /virgata* at depths of 1-4m (Roden and Murphy, in prep.)

Vegetation distribution: maximum depth	Metres	No change to maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question, but is typically expected to be deep in clear, hard water lakes. An indicative target of >6m has been developed for hard water lakes (3140), but this may need to be modified based on the habitat sub-type/form and/or the specific lake in question (see Roden and Murphy, 2013; in prep.). Colonisation tends to be shallower in the machair form of hard water lakes, owing to cloudier water and shallower lake depth (Roden and Murphy, in prep.). Extremely clear marl lakes can have charophyte vegetation to far greater depths, such as Lough Rea (charophytes to 10-11m), or Coolorta (>9m) (Roden and Murphy, in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. 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, particularly the groundwater contribution, 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
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	The hard water lake habitat is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial
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. A target has been set for hard water lakes (3140) of >6m (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms; however, transparency may be relatively lower in the machair form (Roden and Murphy, in prep.)
Water quality: nutrients	µg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to suport the habitat and its typical species	Habitat 3140 is typically associated with high water quality, as demonstrated by low dissolved nutrients. However, some forms appear to be naturally more productive than others. In particular, the machair form may naturally be more nutrient-rich. The default target is WFD 'High Status' or oligotrophic (OECD, 1982). Annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. For machair sites, where study demonstrates it can maintain favourable condition for the long-term, a target of 'good' status or mesotrophic can be applied: annual average TP ≤20µg/l TP and total ammonia ≤0.065mg/l N, total ammonia 95th percentile ≤0.140 mg/l N. Where nutrient concentrations, there should be no upward trend in nutrient concentrations. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Water quality: phytoplankton biomass	µg l-1 Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD 'High Status' or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll *a* concentration must be <5.8 µg/l. Annual average chlorophyll a concentration should be <2.5 µg/l and the annual peak should be <8.0 µg/l. For machair sites, where study demonstrates it can maintain favourable condition for the long-term, a target of 'good' status or mesotrophic can be applied: average growing season chlorophyll *a*: <10 µg/l, annual average <8.0 µg/l, annual peak <25 µg/l. Where chlorophyll *a* concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See 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 EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, the default target for habitat 3140 is 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 hard water lakes (3140) 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, the default target for habitat 3140 is 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 hard water lakes (3140). The EPA monitors macrophyte status for Water Framework Directive purposes using the 'Free Index'. The target for habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥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	The specific requirements of habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to habitat 3140, however eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5). Maximum pH should be <9.0, in line with the surface water standards. See The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free, et al., 2000) and 33mg/l PtCo (Free et al., 2006). Habitat 3140 is typically associated with very clear waters and expected colour would be <10 or, more likely, <5mg/l PtCo. Higher colour is found in some hard water lakes with significant areas of peatland in their catchment, but it is not clear whether this is natural or the result of peatland degradation

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 factors such as shading and competition
Turbidity	nephelometric turbidity units/ mg/l SS/ other appropriate unit	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: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet-woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. Fringing fen habitats can be particularly important around hard water lakes, including the Annex I habitat alkaline fens (habitat code 7230), for which this SAC is selected

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in Slyne Head Peninsula 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	Total area of this habitat has not been calculated although it is known to be distributed thoughout the SAC, usually occurring in mosaic with other habitats such as exposed rock and various grassland types including the Annex I habitat Semi-natural dry grasslands and scubland facies on calcareous substrates (Festuco-Brometalia) (6210) (NPWS internal files)
Habitat distribution	Occurrence	No decline from current habitat distribution, subject to natural processes	See note above. The heath in this SAC is widely distributed and is a good example of a maritime variant in the western part of its Irish and European range (NPWS internal files)
Ecosystem function: soil nutrient status	Soil pH and nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Changes to soil nutrient status can occur from high stock densities or supplementary feeding above appropriate levels
Vegetation composition: positive indicator species	Number and percentage cover at a representative number of monitoring stops	At least two positive indicator species, as listed in Perrin et al. (2014), with combined cover of at least 50%	Attribute and target based on Perrin et al. (2014). Bell heather (*Erica cinerea*), western gorse (*Ulex gallii*), ling (*Calluna vulgaris*) are listed for the heath in this SAC. St. Dabeoc's heath (*Daboecia cantabrica*) is noted as locally common (NPWS internal files)
Vegetation composition: bryophyte and non-crustose lichen species	Number at a representative number of monitoring stops	At least three bryophyte or non-crustose lichen species present, excluding *Campylopus* and *Polytrichum* moss species	Attribute and target based on Perrin et al. (2014)
Vegetation composition: rare/scarce species	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 1999 and/or the red data book (Curtis and McGough, 1988). Pyramidal bugle (*Ajuga pyramidalis*), a species listed in the red data book is known from this SAC (NPWS internal files)
Vegetation structure: dwarf shrub species	Percentage cover at a representative number of monitoring stops	Cover of bog myrtle (*Myrica gale*), creeping willow (*Salix repens*) and Western gorse (*Ulex gallii*) collectively less than 50%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator weed species	Percentage cover at a representative number of monitoring stops	Cover of negative indicator weedy species collectively less than 1%	Attribute and target based on Perrin et al. (2014), where weed species are also listed
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops and in local vicinity	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	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	Cover of bracken (*Pteridium aquilinum*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity	Cover of soft rush (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014). Dense areas of soft rush can indicate disturbance
Vegetation structure: senescent ling	Percentage cover at a representative number of monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Attribute and target based on Perrin et al. (2014)

Vegetation structure: growth phases of ling	Percentage cover in local vicinity	Outside boundaries of sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in mature phase	Attribute and target based on Perrin et al. (2014), where sensitive areas and growth phases are defined
Vegetation structure: signs of browsing	Percentage at a representative number of monitoring stops	Last complete growing season's shoots of ericoids showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity	No signs of burning inside sensitive areas	Attribute and target based on Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)

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 Slyne Head Peninsula 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 status of this habitat within the SAC is currently unclear. As it occurs in intimate association with other habitats including the Annex I European dry heaths (4030) and Smi-natural dry grasslands and scrubland facies on calcareouus substrates (Festuco-Brometalia) (6210), which can also support juniper (*Juniperus communis*), further work is required to establish the habitat's extent, structure and quality
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 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	Cooper et al. (2012) lists positive indicator species for five vegetation groups
Vegetation composition: negative indicator species	Occurrence per formation	Negative indicator species, particularly non-native invasive species, absent or under control	Negative indicator species listed by Cooper et al. (2012)
Vegetation structure: cone-bearing plants	Percentage per formation	At least 10% of 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

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Slyne Head Peninsula, 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	Extent of this habitat within the SAC is unknown. It occurs in intimate association with other habitats in the SAC such as other grasslands, exposed rock and heaths including the Annex I habitat European dry heaths (4030) (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including two "high quality" species	List of positive indicator species, including high quality species, identified by the Irish semi-natural grasslands survey (O'Neill et al., 2013). This document should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species (except certain listed species) and bracken (*Pteridium aquilinum*) not more than 5% cover	Woody species that can occur above 5% cover includes juniper (*Juniperus communis*). However, cover of this species above 25% may indicate transition to another Annex I habitat: *Juniperus communis* formations (5130). Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in Slyne Head Peninsula 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	Extent of this habitat within the SAC is unknown. It is noted as occurring in association with other habitats including wet grassland and heath, and fen (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	List of positive indicator species, including high quality species, identified by O'Neill et al. (2013). Note that purple moor-grass (*Molinia caerulea*) is a positive indicator species, but not necessarily an essential component of the habitat
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: negative indicator moss species	Percentage at a representative number of monitoring stops	Hair mosses (*Polytrichum* spp.) not more than 25% cover	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (*Pteridium aquilinum*) not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 10 and 80cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare ground	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)

To maintain the favourable conservation condition of Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) in Slyne Head Peninsula 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	Extent of this habitat within the SAC is unknown. NPWS internal files note localised areas of species-rich meadows; however, further work is required to establish the nature and extent of this habitat in the SAC, particularly as management by mowing needs to be taken into account
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution of this habitat in this SAC is currently unknown. See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	List of positive indicator species, including high quality species, identified by the Irish semi-natural grasslands survey (O'Neill et al., 2013). This document should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (*Pteridium aquilinum*) not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 50% of sward between 10cm and 50cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 5% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Slyne Head Peninsula 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	Extent of this habitat within the SAC is unknown. Fen has been recorded in association with machair at Mannin Bay as well as with wet grasslands and at lake margins (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note for area above
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation composition: typical species	Percentage	Maintain vegetation cover of typical species including brown mosses and vascular plants	Species recorded at Mannin Bay include blunt-flowered rush (*Juncus subnodulosus*), glaucous sedge (*Carex flacca*), ragged-robin (*Lychnis flos-cuculi*), water mint (*Mentha aquatica*), angelica (*Angelica sylvestris*), bog pimpernel (*Anagallis tenella*) and water horsetail (*Equisetum fluviatile*) (NPWS internal files)
Vegetation composition: trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: drainage	Percentage cover in local vicinity	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)

1395 Petalwort *Petalophyllum ralfsii*

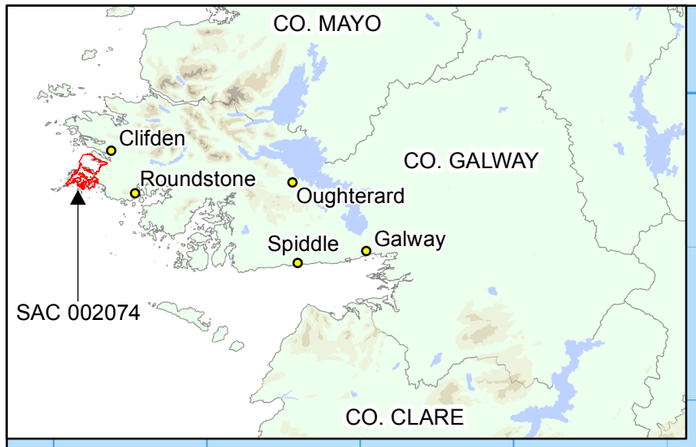
To maintain the favourable conservation condition of Petalwort in Slyne Head Peninsula SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline. See map 10 for recorded locations	The three known populations in this SAC are: Mannin More (Population 14a), Truska Machair (Population 14b) and Doon Hill/West of Aillebrack (Population 14c). Data from NPWS surveys and Campbell (2013)
Population size	Number of individuals	No decline. Population at Mannin More estimated to be c.80,000 thalli; Truska Machair c.2,999,175 thalli; Doon Hill/W. of Aillebrack c.84 thalli. Total c.3,079,260 thalli	Counts of thalli: for Mannin More, Lockhart 2006 estimated c.80,000 thalli; for Truska Machair, from mean of number of thalli in a maximum of eleven 1 x 1m plots, from three counts between February 2009 and March 2011 Campbell (2013) estimated 55.6 thalli per m^2 in 53,942 m^2 = c.2,999,175 thalli; for Doon Hill/W. of Aillebrack, from mean of number of thalli recorded by Lockhart 1998 (300 thalli), Holyoak and Lockhart 1999 (14 thalli), Holyoak 2004 (18 thalli) and Lockhart 2006 (2 thalli) = 83.5 thalli (c.84 thalli)
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Mannin More is estimated to be c.2ha; at Truska Machair, measured as c.5.4ha. Area of suitable habitat at Doon Hill/W. of Aillebrack is currently unknown, but thought to be very small, c.0.0008ha. Total c.7.4ha	The extent of suitable habitat at Mannin More is estimated to be c.19,970m^2. The main extent of occupancy at Truska Machair occur in two areas, mapped using GPS co-ordinates (Campbell, 2013), the largest being c.3,160m^2 and the smaller area to the south-west measuring c.8,760m^2. Only c.75% of this area is actually suitable habitat (53,940m^2). Other outlying point locations at this site add up to 2m^2 (from surveys by Lockhart, 1998; Holyoak and Lockhart, 1999 and Campbell (2013)) giving a total area of suitable habitat at Truska Machair of 53,942m^2. The extent of suitable habitat at Doon Hill/W. of Aillebrack has not been measured by GPS, but is known to be very small (c.8m^2)
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	*Petalophyllum ralfsii* grows in damp sand. Based on Campbell (2013.)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	*Petalophyllum ralfsii* grows in compacted, sandy ground, maintained by rabbit (*Oryctolagus cuniculus*) and sheep grazing and trampling (by walkers and vehicles). Recorded at Mannin More on sparse low (<5cm) closely grazed vegetation by Holyoak 2004 and Lockhart 2006; at Truska Machair, Campbell (2013) recorded a mean height of vegetation of 3.4cm, with bryophyte cover c.26-90% and bare ground c.1-50% (based on eleven 1 x 1m plots between 2009 and 2011); at Doon Hill/W. of Aillebrack, Holyoak 2004 recorded it on partly bare, damp calcareous sand in small hollows in heavily grazed machair, mainly where machair surface disturbed, e.g. in old wheel ruts

1833 Slender Naiad *Najas flexilis*

To maintain the favourable conservation condition of Slender Naiad in Slyne Head Peninsula SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population extent	Hectares, distribution	No change to the spatial extent of *Najas flexilis* within the lake, subject to natural processes. See map 11 for known location	See *Najas flexilis* supporting document for further details
Population depth	Metres	No change to the depth range of *Najas flexilis*, subject to natural processes	See *Najas flexilis* supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See *Najas flexilis* supporting document for further details
Species distribution	Square metres	No change to the cover abundance of *Najas flexilis*, subject to natural processes	See *Najas flexilis* supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See *Najas flexilis* supporting document for further details
Habitat extent	Hectares	No decline, subject to natural processes	See *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See *Najas flexilis* supporting document for further details
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the populations of the species	See *Najas flexilis* supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the populations of the species	See *Najas flexilis* supporting document for further details
Acidification status	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the populations of *Najas flexilis*, subject to natural processes	See *Najas flexilis* supporting document for further details
Water colour	mg/L PtCo	Maintain appropriate water colour to support the populations of *Najas flexilis*	See *Najas flexilis* supporting document for further details
Associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the populations of *Najas flexilis*	See *Najas flexilis* supporting document for further details



MANNIN BAY
Cuan Mhanainn

Slyne Head Peninsula SAC 002074

MAP 1:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

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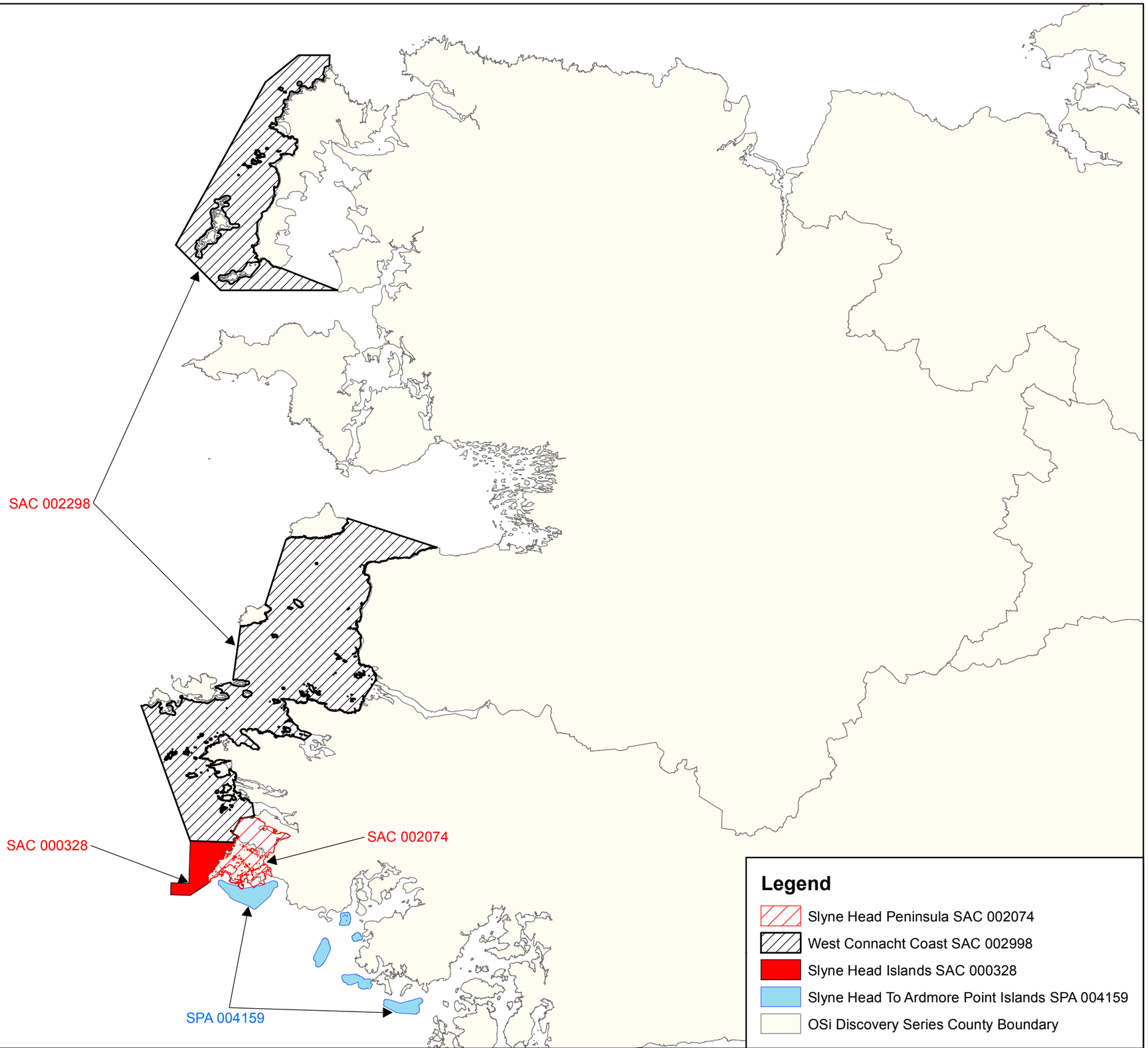
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Map Version 1
Date: Jan 2015



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MAP 2:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING
DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01.
SAC 000328; version 3.01, SAC 002998; version 3.
SPA 004159; version 1.01. CO. GALWAY / MAYO

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Map Version 1
Date: Jan 2015

IL068: L. Athola

IL067: L. Ballyconneely

Legend

- Slyne Head Peninsula SAC 002074
- 1150 *Coastal Lagoons
- OSi Discovery Series County Boundary

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MAP 3:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING
COASTAL LAGOONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Jan 2015

Legend

- Slyne Head Peninsula SAC 002074
- 1160 Large shallow inlets and bays
- OSi Discovery Series County Boundary

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MAP 4:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAYS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

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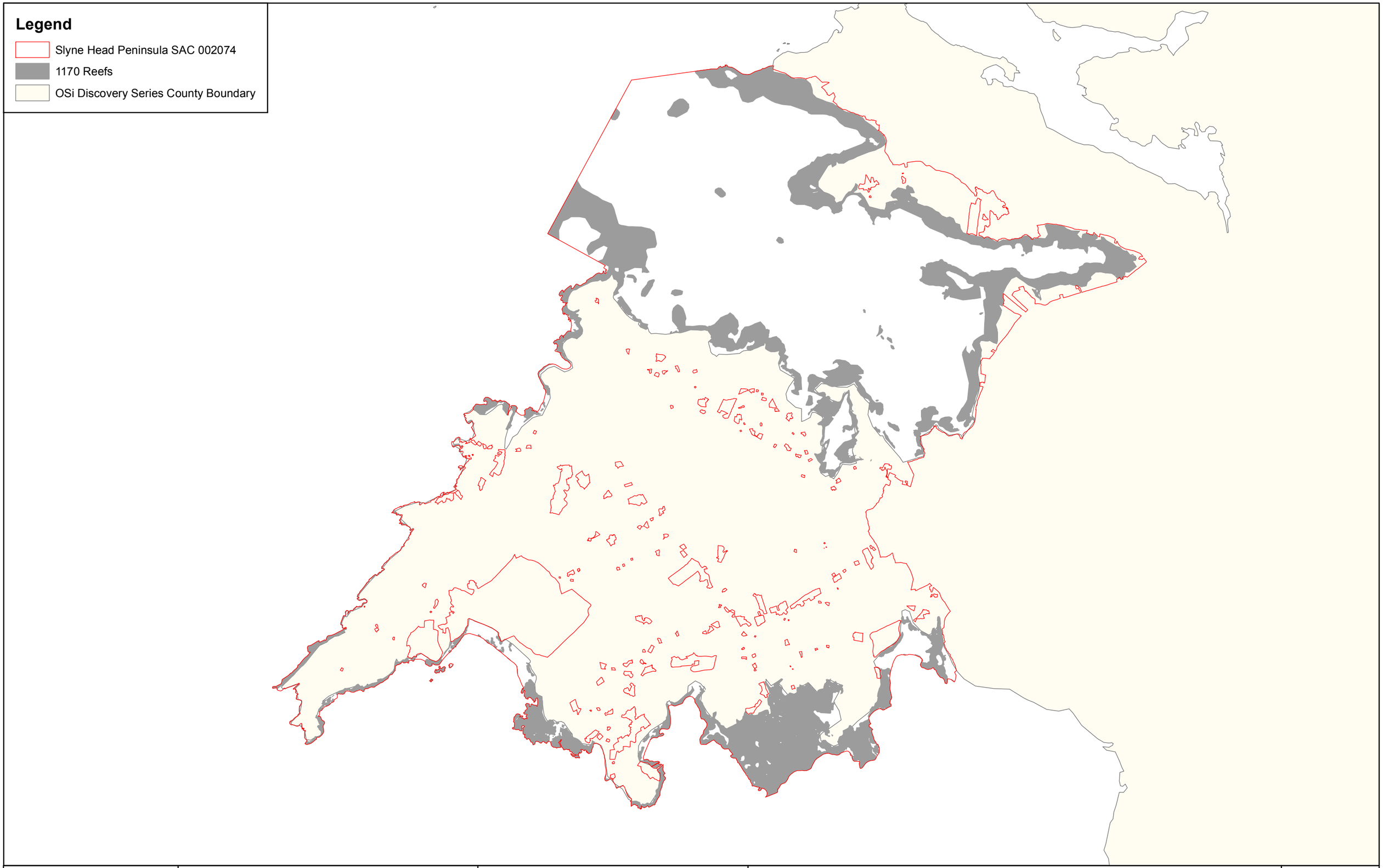
Map Version 1
Date: Jan 2015



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MAP 5:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
REEFS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

N

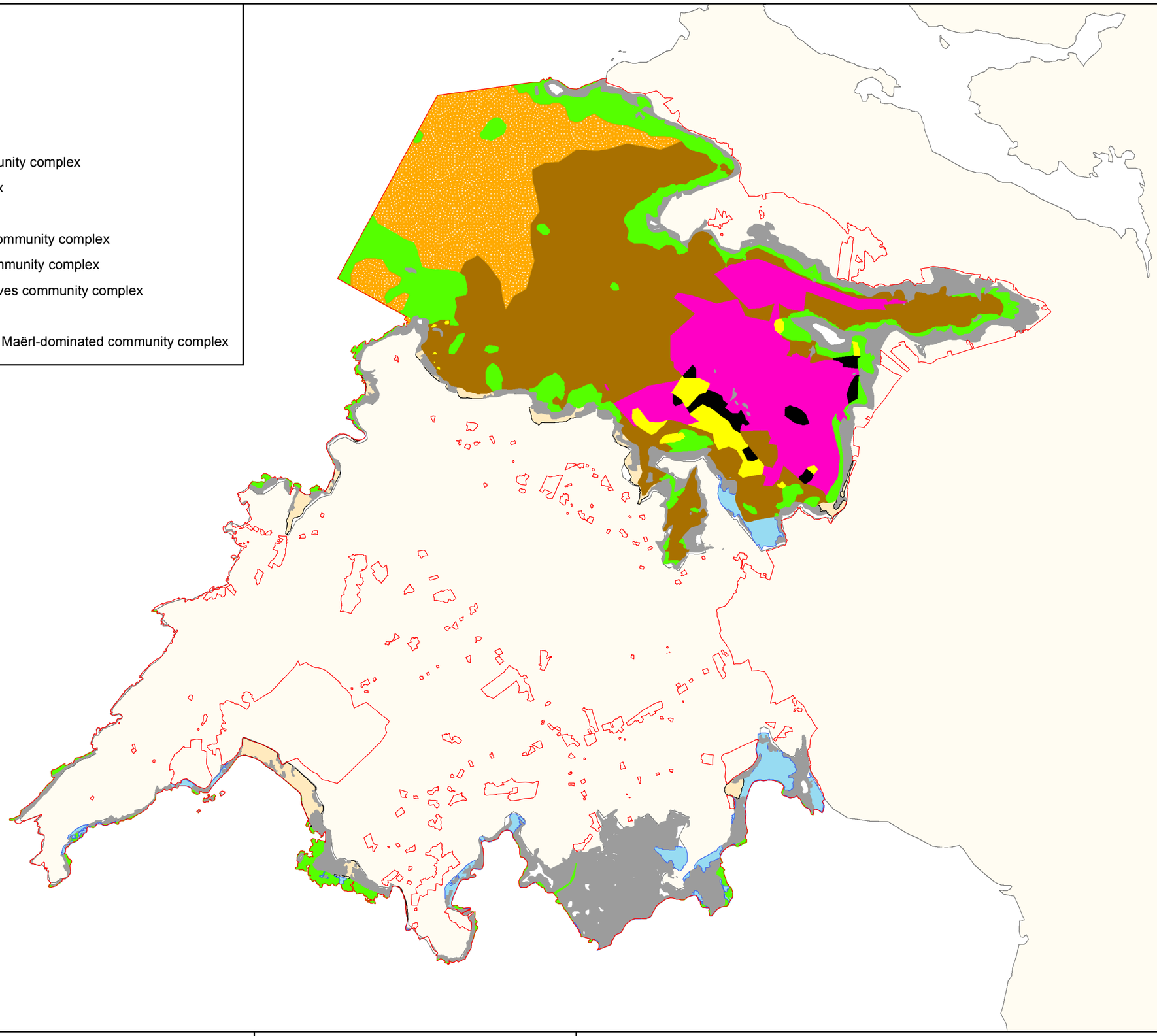
Map Version 1
Date: Jan 2015

Legend

- Slyne Head Peninsula SAC 002074
- OSi Discovery Series County Boundary

Marine Community Types

- Intertidal reef community complex
- Intertidal sand with Enchytraeidae community complex
- *Laminaria*-dominated community complex
- Maërl-dominated community complex
- Mobile intertidal sand with polychaetes community complex
- Subtidal sand with *Kurtiella bidentata* community complex
- Subtidal sand with polychaetes and bivalves community complex
- *Zostera*-dominated community complex
- *Zostera*-dominated community complex / Maërl-dominated community complex



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MAP 6:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

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Map Version 1
Date: Jan 2015

Legend

Slyne Head Peninsula SAC 002074

OSi Discovery Series County Boundary

SMP: 0104 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

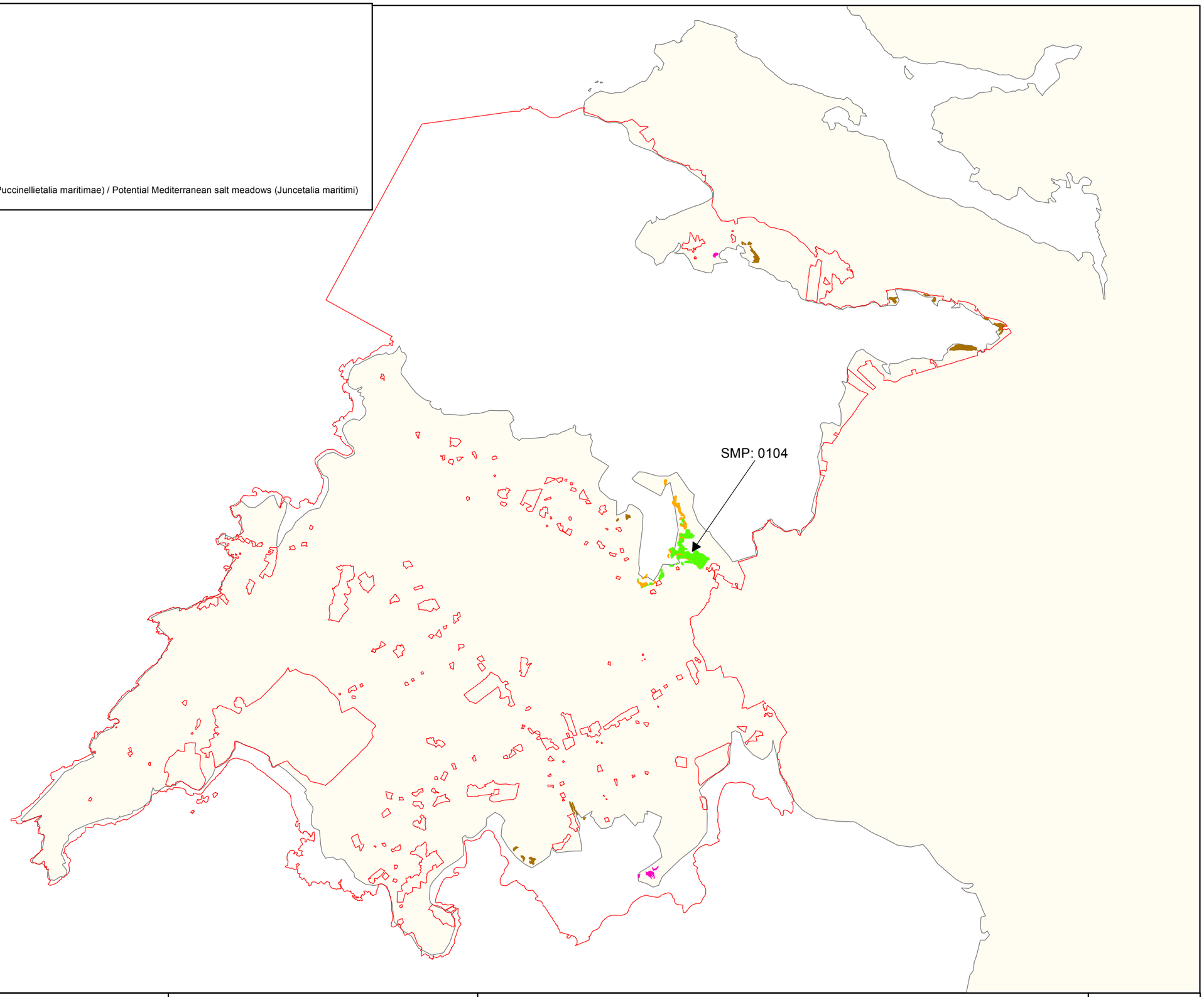
Qualifying Interests

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1410 Mediterranean salt meadows (Juncetalia maritimi)

Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

Potential 1330 / Potential 1410. Potential Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Potential Mediterranean salt meadows (Juncetalia maritimi)



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MAP 7:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

N

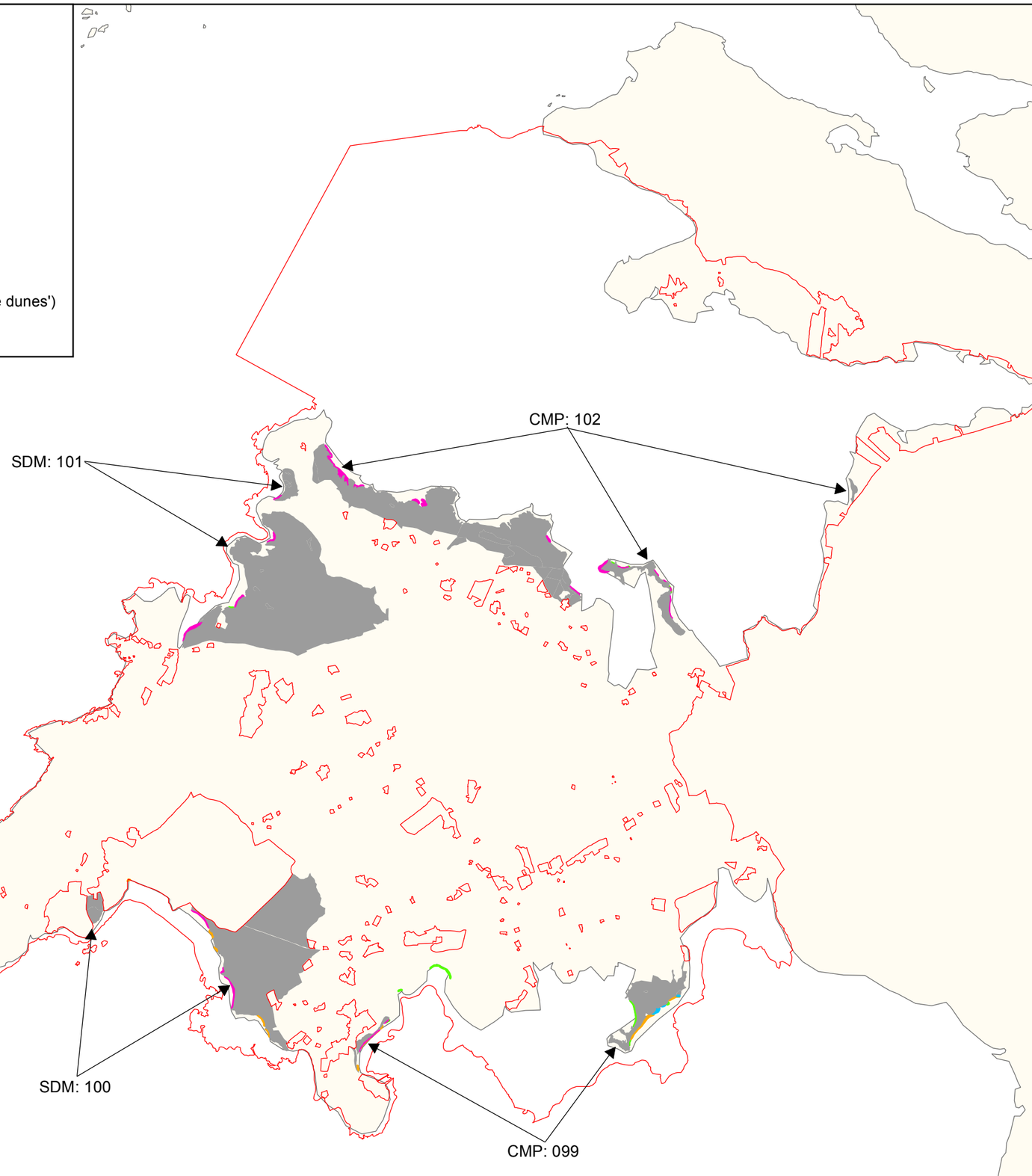
Map Version 1
Date: Jan 2015

Legend

- Slyne Head Peninsula SAC 002074
- OSi Discovery Series County Boundary
- CMP: 099 Coastal Monitoring Project Site Codes
- SDM: 100 Sand Dunes Monitoring Project Site Codes

Sand Dune Habitats

- 1210 Annual vegetation of drift lines
- 1220 Perennial vegetation of stony banks
- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 21A0 * Machairs



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MAP 8:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

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Map Version 1
Date: Jan 2015

Legend

- Slyne Head Peninsula SAC 002074
- OSi Discovery Series County Boundary

Lake Habitats

- 3130 / Potential 3110. Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea / Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- 3140 / Potential 3150. Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. / Potential Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- Potential 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Potential 3140 / Potential 3150. Potential Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. / Potential Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- Unkown Lake Habitats

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MAP 9: SLYNE HEAD PENINSULA SAC CONSERVATION OBJECTIVES LAKE HABITATS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

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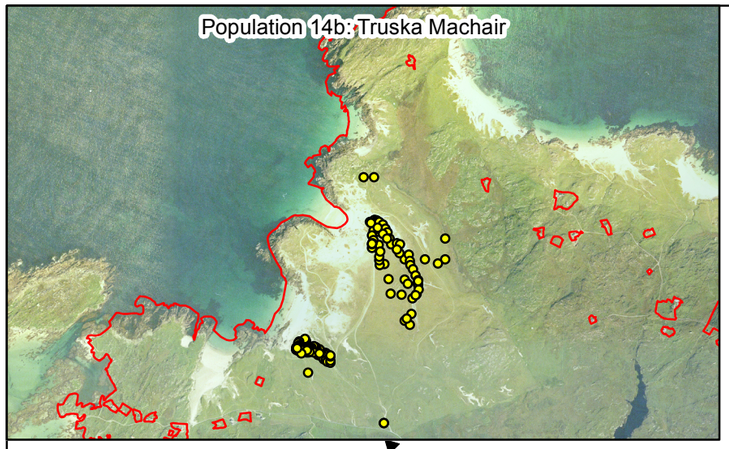
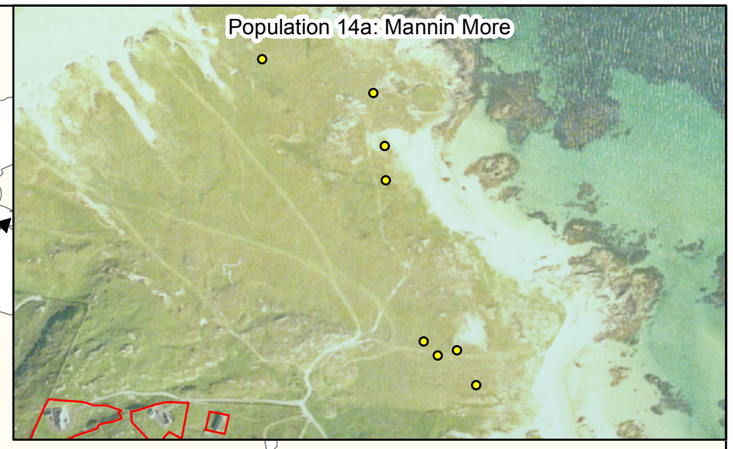
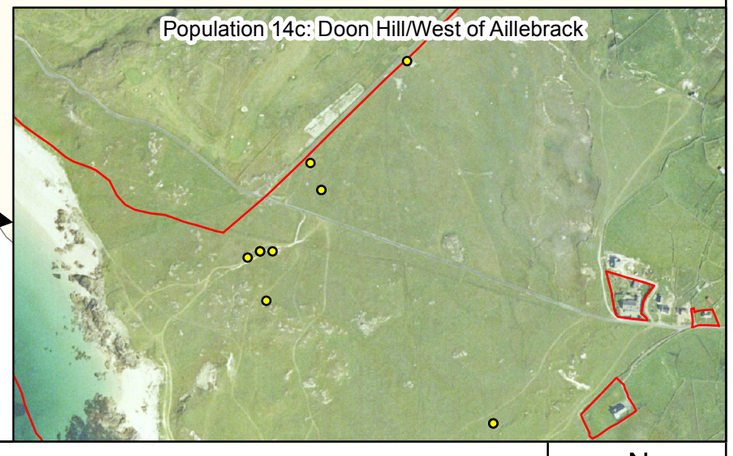
Map Version 1
Date: Jan 2015







Legend

- Slyne Head Peninsula SAC 002074
- 1395 Petalwort - *Petalophyllum ralfsii*
- OSi Discovery Series County Boundary

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MAP 10: SLYNE HEAD PENINSULA SAC CONSERVATION OBJECTIVES PETALWORT

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

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Map Version 1
Date: Jan 2015

Lough Anaserd

Legend

- Slyne Head Peninsula SAC 002074
- 1833 Slender Naiad - *Najas flexilis*
- OSi Discovery Series County Boundary

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MAP 11:
SLYNE HEAD PENINSULA SAC
CONSERVATION OBJECTIVES
SLENDER NAIAD

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002074; version 3.01. CO. GALWAY

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Jan 2015