

# National Parks and Wildlife Service

## *Conservation Objectives Series*

Mweelrea/Sheeffry/Erriff Complex SAC 001932



An Roinn  
Cultúir, Oidhreachta agus Gaeltachta  

---

Department of  
Culture, Heritage and the Gaeltacht



**National Parks and Wildlife Service,  
Department of Culture, Heritage and the Gaeltacht,  
7 Ely Place, Dublin 2, Ireland.  
Web: [www.npws.ie](http://www.npws.ie)  
E-mail: [nature.conservation@ahg.gov.ie](mailto:nature.conservation@ahg.gov.ie)**

**Citation:**

**NPWS (2017) Conservation Objectives: Mweelrea/Sheeffry/Erriff Complex SAC  
001932. Version 1. National Parks and Wildlife Service, Department of Culture,  
Heritage and the Gaeltacht.**

**Series Editor: Rebecca Jeffrey  
ISSN 2009-4086**

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

Code	Description
001932	Mweelrea/Sheeffry/Erriff Complex SAC
1013	Geyer's Whorl Snail <i>Vertigo geyeri</i>
1014	Narrow-mouthed Whorl Snail <i>Vertigo angustior</i>
1029	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>
1106	Salmon <i>Salmo salar</i>
1150	Coastal lagoonsE
1210	Annual vegetation of drift lines
1330	Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> )
1355	Otter <i>Lutra lutra</i>
1395	Petalwort <i>Petalophyllum ralfsii</i>
1410	Mediterranean salt meadows ( <i>Juncetalia maritimi</i> )
1833	Slender Naiad <i>Najas flexilis</i>
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with <i>Cladonia</i> (white dunes)
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)E
2170	Dunes with <i>Salicornia</i> ssp. <i>arenaria</i> ( <i>Salicion arenariae</i> )
21A0	Machairs (* in Ireland)
3110	Oligotrophic waters containing very few minerals of sandy plains ( <i>Littorelletalia uniflorae</i> )
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>
3160	Natural dystrophic lakes and ponds
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
4010	Northern Atlantic wet heaths with <i>Calluna</i>
4030	European dry heaths
4060	Alpine and Boreal heaths
5130	<i>Ranunculus</i> formations on heaths or calcareous grasslands
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the <i>Rhynchosporion</i>
7220	Petrifying springs with tufa formation ( <i>Cratoneurion</i> )E
7230	Alkaline fens
8110	Siliceous scree of the montane to snow levels ( <i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i> )
8210	Calcareous rocky slopes with chasmophytic vegetation
8220	Siliceous rocky slopes with chasmophytic vegetation

**Please note that this SAC is adjacent to West Connaght Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.**

## Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: [www.npws.ie/Publications](http://www.npws.ie/Publications)

### NPWS Documents

<b>Year :</b>	1987
<b>Title :</b>	The vegetation of Irish rivers
<b>Author :</b>	Heuff, H.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	1987
<b>Title :</b>	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
<b>Author :</b>	Foss, P.; McGee, E.
<b>Series :</b>	A report commissioned by the Wildlife Service
<b>Year :</b>	1989
<b>Title :</b>	Survey to locate blanket bogs of scientific interest in Mayo. Part II
<b>Author :</b>	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.
<b>Series :</b>	A report commissioned by the Wildlife Service
<b>Year :</b>	1995
<b>Title :</b>	Mapping of proposed SAC rivers for <i>Margaritifera margaritifera</i> . A report for the National Parks and Wildlife Service on work carried out from August to October 1995 (in two volumes) Volume 1
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	1998
<b>Title :</b>	Biomar survey of Irish machair sites 1996
<b>Author :</b>	Crawford, I.; Bleasdale, A.; Conaghan, J.
<b>Series :</b>	Irish Wildlife Manual No. 3
<b>Year :</b>	1998
<b>Title :</b>	Biomar survey of Irish machair sites, 1996. Vol. 2: plant communities
<b>Author :</b>	Crawford, I.; Bleasdale, A.; Conaghan, J.
<b>Series :</b>	Irish Wildlife Manual No. 4
<b>Year :</b>	2002
<b>Title :</b>	<i>Najas flexilis</i> in Donegal
<b>Author :</b>	Roden, C.M.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2004
<b>Title :</b>	The distribution of <i>Najas flexilis</i> in Ireland 2002-2004
<b>Author :</b>	Roden, C.M.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2005
<b>Title :</b>	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> . Baseline survey of the Bundorragha River cSAC, County Mayo
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2006
<b>Title :</b>	Otter survey of Ireland 2004/2005
<b>Author :</b>	Bailey, M.; Rochford, J.
<b>Series :</b>	Irish Wildlife Manual No. 23

<b>Year :</b>	2007
<b>Title :</b>	Saltmarsh Monitoring Project 2006
<b>Author :</b>	McCorry, M.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2007
<b>Title :</b>	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
<b>Author :</b>	NPWS
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2007
<b>Title :</b>	Inventory of Irish coastal lagoons (version 2)
<b>Author :</b>	Oliver, G.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2007
<b>Title :</b>	Management prescriptions for <i>Vertigo angustior</i> at cSAC sites for the species in the Republic of Ireland
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	Coastal Monitoring Project 2004-2006
<b>Author :</b>	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	Saltmarsh monitoring project 2007-2008
<b>Author :</b>	McCorry, M.; Ryle, T.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
<b>Author :</b>	Paul Johnston Associates
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater pearl mussel sub-basin management plans: Monitoring of the freshwater pearl mussel in the Bundorragha
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	Lichen searches of rivers, loughs, mountains: Cos Wicklow, Sligo, Mayo and Galway. September 2009
<b>Author :</b>	Giavarini, V.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater pearl mussel sub-basin management plans: Report on biological monitoring of surface water quality in the Bundorragha catchment
<b>Author :</b>	Williams, L.
<b>Series :</b>	Unpublished report to NPWS

<b>Year :</b>	2010
<b>Title :</b>	Second draft Bundorragha freshwater pearl mussel sub-basin management plan (2009-2015). March 2010
<b>Author :</b>	NPWS
<b>Series :</b>	Unpublished document to the Department of the Environment, Heritage and Local Government
<b>Year :</b>	2011
<b>Title :</b>	Monitoring and condition assessment of populations of <i>Vertigo geyeri</i> , <i>Vertigo angustior</i> and <i>Vertigo moulinsiana</i> in Ireland
<b>Author :</b>	Moorkens, E.; Killeen, I.
<b>Series :</b>	Irish Wildlife Manual No. 55
<b>Year :</b>	2011
<b>Title :</b>	Implementation of a <i>Vertigo</i> monitoring programme: <i>Vertigo angustior</i> monitoring at Dooaghtry
<b>Author :</b>	Moorkens, E.A.; Killeen, I.J.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2011
<b>Title :</b>	Implementation of a <i>Vertigo</i> monitoring programme: <i>Vertigo geyeri</i> monitoring at Dooaghtry
<b>Author :</b>	Moorkens, E.A.; Killeen, I.J.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2012
<b>Title :</b>	The conservation status of juniper formations in Ireland
<b>Author :</b>	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
<b>Series :</b>	Irish Wildlife Manual No. 63
<b>Year :</b>	2012
<b>Title :</b>	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> . A condition assessment survey of the freshwater pearl mussel in the Bundorragha River, Co. Mayo
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2012
<b>Title :</b>	Ireland Red List No. 8: Bryophytes
<b>Author :</b>	Lockhart, N.; Hodgetts, N.; Holyoak, D.
<b>Series :</b>	Ireland Red List series, NPWS
<b>Year :</b>	2013
<b>Title :</b>	Conservation status assessment for petrifying springs
<b>Author :</b>	Lyons, M.D.; Kelly, D.L.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2013
<b>Title :</b>	National otter survey of Ireland 2010/12
<b>Author :</b>	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
<b>Series :</b>	Irish Wildlife Manual No. 76
<b>Year :</b>	2013
<b>Title :</b>	Monitoring survey of Annex I sand dune habitats in Ireland
<b>Author :</b>	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
<b>Series :</b>	Irish Wildlife Manual No. 75
<b>Year :</b>	2013
<b>Title :</b>	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation assessments



<b>Year :</b>	2013
<b>Title :</b>	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation assessments
<b>Year :</b>	2014
<b>Title :</b>	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
<b>Author :</b>	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
<b>Series :</b>	Irish Wildlife Manual No. 79
<b>Year :</b>	2014
<b>Title :</b>	Interim Bundorragha condition assessment. Preliminary results from Bundorragha River monitoring work 2014
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2014
<b>Title :</b>	Targeted survey of <i>Najas flexilis</i>
<b>Author :</b>	Roden, C.; Murphy, P.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2014
<b>Title :</b>	National Survey of Upland Habitats (Phase 1, 2010-2011) Site report no 1: Mweelrea/Sheeffry/Erriff Complex cSAC (001932) Co. Mayo (Revision)
<b>Author :</b>	Roche, J.R.; Perrin, P.M.; Barron, S.J.; Daly, O.H.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2015
<b>Title :</b>	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
<b>Author :</b>	O Connor, Á.
<b>Series :</b>	Unpublished document by NPWS
<b>Year :</b>	2015
<b>Title :</b>	Monitoring methods for <i>Petalophyllum ralfsii</i> (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland
<b>Author :</b>	Campbell, C.; Hodgetts, N.; Lockhart, N.
<b>Series :</b>	Irish Wildlife Manual No. 90
<b>Year :</b>	2016
<b>Title :</b>	Monitoring guidelines for the assessment of petrifying springs in Ireland
<b>Author :</b>	Lyons, M.D.; Kelly, D.L.
<b>Series :</b>	Irish Wildlife Manual No. 94
<b>Year :</b>	2016
<b>Title :</b>	Ireland Red List No. 10: Vascular Plants
<b>Author :</b>	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
<b>Series :</b>	Ireland Red Lists series, NPWS
<b>Year :</b>	2017
<b>Title :</b>	Mweelrea/Sheeffry/Erriff Complex SAC (site code: 1932) Conservation objectives supporting objectives supporting document- coastal lagoons V1
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation objectives supporting document

**Year :** 2017  
**Title :** Survey and condition assessment of the population of the freshwater mussel *Margaritifera margaritifera* in the Bundorragha River, County Mayo  
**Author :** Moorkens, E.  
**Series :** Unpublished report to NPWS

---

**Year :** 2017  
**Title :** Mweelrea/Sheeffry/Erriff Complex SAC (site code: 1932) Conservation objectives supporting document- blanket bogs and associated habitats V1  
**Author :** NPWS  
**Series :** Conservation objectives supporting document

---

**Year :** 2017  
**Title :** Mweelrea/Sheeffry/Erriff Complex SAC (site code: 1932) Conservation objectives supporting document- coastal habitats V1  
**Author :** NPWS  
**Series :** Conservation objectives supporting document

---

**Year :** 2017  
**Title :** Mweelrea/Sheeffry/Erriff Complex SAC (site code: 1932) Conservation objectives supporting document- *Najas flexilis* V1  
**Author :** NPWS  
**Series :** Conservation objectives supporting document

---

## Other References

**Year :** 1982  
**Title :** Otter survey of Ireland  
**Author :** Chapman, P.J.; Chapman, L.L.  
**Series :** Unpublished report to Vincent Wildlife Trust

---

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

---

**Year :** 1984  
**Title :** Studies on the biology of freshwater mussels (Lamellibranchia: Unionacea) in Ireland  
**Author :** Ross, E.D.  
**Series :** Unpublished MSc Thesis. National University of Ireland, Galway

---

**Year :** 1988  
**Title :** The reproductive biology of freshwater mussels in Ireland, with observations on their distribution and demography  
**Author :** Ross, E.D.  
**Series :** Unpublished Ph.D. Thesis, National University of Ireland, Galway

---

**Year :** 1991  
**Title :** The spatial organization of otters (*Lutra lutra*) in Shetland  
**Author :** Kruuk, H.; Moorhouse, A.  
**Series :** Journal of Zoology, 224: 41-57

---

**Year :** 1993  
**Title :** The non-marine Mollusca of Dooaghtry, Co. Mayo: changes in the fauna since 1910  
**Author :** Tattersfield, P.  
**Series :** Irish Naturalists' Journal, 24: 183-192

---

<b>Year :</b>	1996
<b>Title :</b>	Studies on the biology and ecology of <i>Margaritifera</i> in Ireland
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished Ph.D. thesis, University of Dublin, Trinity College.
<b>Year :</b>	1999
<b>Title :</b>	Diet of otters ( <i>Lutra lutra</i> ) on Inishmore, Aran Islands, west coast of Ireland
<b>Author :</b>	Kingston, S.; O'Connell, M.; Fairley, J.S.
<b>Series :</b>	Biology and Environment: Proceedings of the Royal Irish Academy, 99B: 173-182
<b>Year :</b>	2000
<b>Title :</b>	Colour in Irish lakes
<b>Author :</b>	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
<b>Series :</b>	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
<b>Year :</b>	2001
<b>Title :</b>	Aquatic plants in Britain and Ireland
<b>Author :</b>	Preston, C.D.; Croft, J.M.
<b>Series :</b>	Harley Books, Colchester
<b>Year :</b>	2002
<b>Title :</b>	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
<b>Author :</b>	Arts, G.H.P.
<b>Series :</b>	Aquatic Botany, 73: 373-393
<b>Year :</b>	2003
<b>Title :</b>	Ecology of watercourses characterised by Ranunculion fluitantis and Callitriche-Batrachion vegetation
<b>Author :</b>	Hatton-Ellis, T.W.; Grieve, N.
<b>Series :</b>	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
<b>Year :</b>	2004
<b>Title :</b>	The ecology of <i>Najas flexilis</i>
<b>Author :</b>	Wingfield, R.A.; Murphy, K.J.; Hollingsworth, P.; Gaywood, M.J.
<b>Series :</b>	Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)
<b>Year :</b>	2004
<b>Title :</b>	Non-marine Mollusca: New and notable records for Ireland
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Bulletin of the Irish Biogeographical Society, 28: 189-198
<b>Year :</b>	2005
<b>Title :</b>	Widespread occurrence of <i>Vertigo geyeri</i> (Gastropoda: Vertiginidae) in north and west Ireland
<b>Author :</b>	Holyoak, G.A.
<b>Series :</b>	Irish Naturalists' Journal, 28: 141-150
<b>Year :</b>	2006
<b>Title :</b>	Otters - ecology, behaviour and conservation
<b>Author :</b>	Kruuk, H.
<b>Series :</b>	Oxford University Press
<b>Year :</b>	2006
<b>Title :</b>	The status of host fish populations and fish species richness in European freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) streams
<b>Author :</b>	Geist, J.; Porkka, M.; Kuehn, R.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266

<b>Year :</b>	2006
<b>Title :</b>	The vegetation of Irish machair
<b>Author :</b>	Gaynor, K.
<b>Series :</b>	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
<b>Year :</b>	2006
<b>Title :</b>	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)
<b>Author :</b>	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
<b>Series :</b>	EPA, Wexford
<b>Year :</b>	2008
<b>Title :</b>	The phytosociology and conservation value of Irish sand dunes
<b>Author :</b>	Gaynor, K.
<b>Series :</b>	Unpublished Ph.D. Thesis, National University of Ireland, Dublin
<b>Year :</b>	2008
<b>Title :</b>	Water Quality in Ireland 2004-2006
<b>Author :</b>	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
<b>Series :</b>	EPA, Wexford
<b>Year :</b>	2009
<b>Title :</b>	The identification, characterization and conservation value of isoetid lakes in Ireland
<b>Author :</b>	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
<b>Year :</b>	2010
<b>Title :</b>	Otter tracking study of Roaringwater Bay
<b>Author :</b>	De Jongh, A.; O'Neill, L.
<b>Series :</b>	Unpublished draft report to NPWS
<b>Year :</b>	2010
<b>Title :</b>	Addressing the conservation and rehabilitation of <i>Margaritifera margaritifera</i> populations in the Republic of Ireland within the framework of the habitats and species directive
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Journal of Conchology, 40: 339
<b>Year :</b>	2010
<b>Title :</b>	Water quality in Ireland 2007-2009
<b>Author :</b>	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
<b>Series :</b>	EPA, Wexford
<b>Year :</b>	2012
<b>Title :</b>	The impact of conifer plantation forestry on the ecology of peatland lakes
<b>Author :</b>	Drinan, T.J.
<b>Series :</b>	Unpublished Ph.D. thesis, University College Cork
<b>Year :</b>	2013
<b>Title :</b>	Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive
<b>Author :</b>	Roden, C.M.; Oliver, G.
<b>Series :</b>	Unpublished Report to the EPA

<b>Year :</b>	2013
<b>Title :</b>	Conservation of selected legally protected and Red Listed bryophytes in Ireland
<b>Author :</b>	Campbell, C.
<b>Series :</b>	Unpublished Ph.D. Thesis, Trinity College Dublin
<b>Year :</b>	2013
<b>Title :</b>	Management strategies for the protection of high status water bodies
<b>Author :</b>	Ní Chatháin, B.; Moorkens, E.; Irvine, K.
<b>Series :</b>	Strive Report Series No. 99. EPA, Wexford
<b>Year :</b>	2013
<b>Title :</b>	Interpretation manual of European Union habitats- Eur 28
<b>Author :</b>	European Commission- DG Environment
<b>Series :</b>	European Commission
<b>Year :</b>	2014
<b>Title :</b>	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) in Ireland
<b>Author :</b>	Moorkens, E.; Killeen, I.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
<b>Year :</b>	2014
<b>Title :</b>	The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots in upland UK
<b>Author :</b>	Marshall, M.R.; Ballard, C.E.; Frogbrook, Z.L.; Solloway, I.; McIntyre, N.; Reynolds, B.; Wheater, H.S.
<b>Series :</b>	Hydrological Processes, 28: 2617-2629
<b>Year :</b>	2015
<b>Title :</b>	Water quality in Ireland 2010-2012
<b>Author :</b>	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
<b>Series :</b>	EPA, Wexford
<b>Year :</b>	2015
<b>Title :</b>	The flora and conservation status of petrifying springs in Ireland
<b>Author :</b>	Lyons, M.D.
<b>Series :</b>	Unpublished Ph.D. Thesis, Trinity College Dublin
<b>Year :</b>	2016
<b>Title :</b>	A narrative for conserving freshwater and wetland habitats in England
<b>Author :</b>	Mainstone, C.; Hall, R.; Diack, I.
<b>Series :</b>	Natural England Research Reports Number 064
<b>Year :</b>	2016
<b>Title :</b>	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
<b>Author :</b>	SSCS (Standing Scientific Committee on Salmon)
<b>Series :</b>	Independent Scientific Report to Inland Fisheries Ireland

## Spatial data sources

<b>Year :</b>	Revision 2011
<b>Title :</b>	Inventory of Irish Coastal Lagoons. Version 3
<b>GIS Operations :</b>	Clipped to SAC boundary
<b>Used For :</b>	1150 (map 3)
<b>Year :</b>	Revision 2010
<b>Title :</b>	Saltmarsh Monitoring Project 2007-2008. Version 1
<b>GIS Operations :</b>	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
<b>Used For :</b>	1330, 1410 (map 4)
<b>Year :</b>	2013
<b>Title :</b>	Sand Dune Monitoring Project 2011. Version 1
<b>GIS Operations :</b>	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
<b>Used For :</b>	1210, 2110, 2120, 2150, 2170, 21A0 (map 5)
<b>Year :</b>	2008
<b>Title :</b>	OSi 1:5000 IG vector dataset
<b>GIS Operations :</b>	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
<b>Used For :</b>	3110, 3130, 3160 (map 6)
<b>Year :</b>	2011
<b>Title :</b>	National Survey of Upland Habitats
<b>GIS Operations :</b>	Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	4010, 4030, 4060, 6430, 7130, 7140, 7150, 7230, 8110, 8210, 8220 (maps 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18)
<b>Year :</b>	Derived 2012
<b>Title :</b>	Internal NPWS files
<b>GIS Operations :</b>	Dataset created from spatial reference contained in files
<b>Used For :</b>	7220 (map 14)
<b>Year :</b>	2017
<b>Title :</b>	NPWS rare and threatened species database
<b>GIS Operations :</b>	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	1013, 1014, 1029, 1395 (maps 19, 20 and 22)
<b>Year :</b>	Revision 2012
<b>Title :</b>	Margaritifera Sensitive Areas data
<b>GIS Operations :</b>	Relevant catchment boundary identified. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	1029 (map 20)
<b>Year :</b>	2005
<b>Title :</b>	OSi Discovery series vector data
<b>GIS Operations :</b>	Creation of 80m buffer on marine side of high water mark (HWM); creation of 10m buffer on terrestrial side of HWM; combination of 80m and 10m HWM buffer datasets; creation of 10m buffer on terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. These datasets combined with derived EPA WFD Waterbodies data and Coastal Lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on marine side of HWM to highlight potential commuting points
<b>Used For :</b>	1355 (map 21)

<b>Year :</b>	2010
<b>Title :</b>	EPA WFD Waterbodies data
<b>GIS Operations :</b>	Creation of 20m buffer applied to river and stream centreline data; creation of 80m buffer on aquatic side of lake data; creation of 10m buffer on terrestrial side of lake data. These datasets combined with derived OSi data and coastal lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on aquatic side of the lake boundary to highlight potential commuting points
<b>Used For :</b>	1355 (map 21)
<hr/>	
<b>Year :</b>	Revision 2011
<b>Title :</b>	Inventory of Irish Coastal Lagoons. Version 3
<b>GIS Operations :</b>	Creation of 80m buffer on the aquatic side of lagoon data; creation of 10m buffer on the terrestrial side of lagoon data. These datasets combined with derived OSi data and EPA WFD Waterbodies data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	1355 (map 21)
<hr/>	
<b>Year :</b>	2013
<b>Title :</b>	Najas flexilis data
<b>GIS Operations :</b>	Lake habitat for species clipped to SAC boundary
<b>Used For :</b>	1833 (map 23)
<hr/>	

**1150 Coastal lagoons**

**To restore the favourable conservation condition of Coastal lagoons\* in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area: 7.9ha. See map 3	Area calculated from spatial data derived from Oliver (2007) for Corragaun Lough (site code IL071). See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal lagoons for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for mapped lagoon	Site code IL071 (Corragaun Lough) in Oliver (2007). See the lagoon supporting document for further details
Salinity regime	Practical salinity units (psu)	Annual median salinity and temporal variation within natural ranges	Corragaun Lough is recorded as a mesohaline to euhaline lagoon. See the lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	The maximum depth of Corragaun Lough is recorded as less than 1m. See the lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoon and sea, including where necessary, appropriate management	Corragaun Lough is described as a natural sedimentary lagoon. See the lagoon supporting document for further details
Water quality: Chlorophyll <i>a</i>	µg/L	Annual median chlorophyll <i>a</i> within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2013). See the lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	Target based on Roden and Oliver (2013). See the lagoon 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 the lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoon	As the lagoon is less than 2m deep, it is expected that macrophyte colonisation would extend to the full depth. See the lagoon supporting document for further details
Typical plant species	Number and m <sup>2</sup>	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver (2007). See the lagoon supporting document for further details
Typical animal species	Number	Maintain listed lagoonal specialists, subject to natural variation	Species listed in Oliver (2007). See the lagoon supporting document for further details
Negative indicator species	Number and percentage cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of accelerated encroachment by reedbeds. See the lagoon supporting document for further details



**1210 Annual vegetation of drift lines**

**To maintain the favourable conservation condition of Annual vegetation of drift lines in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Dooaghtry - 0.18ha. See map 5	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Annual vegetation of drift lines was mapped at the sub-site Dooaghtry (SDM site ID: 108) to give a total estimated area of 0.18ha within Mweelrea/Sheeffry/Erriff Complex SAC. The 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. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 5 for known distribution	Based on data from Delaney et al. (2013). The greatest area of the annual vegetation of drift lines habitat is found in the southern part of the Dooaghtry sub-site. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from 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. Physical barriers will effect sediment supply at these sites. Coastal defences are present close to the outflow of the Owenadornaun river, but these appear to be longstanding structures. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). There are transitional communities between a range of sand dune habitats in the SAC. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket ( <i>Cakile maritima</i> ), sea sandwort ( <i>Honckenya peploides</i> ), prickly saltwort ( <i>Salsola kali</i> ) and oraches ( <i>Atriplex</i> spp.)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Typical species of annual vegetation of drift lines occurring at Dooaghtry includes prickly saltwort ( <i>Salsola kali</i> ). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details

**1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**

**To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites (Dooaghtry and Aasleagh Falls) and potential areas mapped: 21.2ha. See map 4	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). Two sub-sites that support Atlantic salt meadows (ASM) were mapped, Dooaghtry (SMP site ID: SMP0010) - 16.23ha and Aasleagh Falls (SMP site ID: SMP0106) - 0.31ha, and additional areas of potential ASM habitat (4.66ha) were identified from an examination of aerial photographs, giving a total estimated area of 21.2ha within Mweelrea/Sheeffry/Erriff Complex SAC. NB further unsurveyed areas may be present within the SAC. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 4 for mapped and potential distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the northern section of the Dooaghtry sub-site, which is located on the seaward side of Corragaun Lough, ASM is present on both sides of the entrance/outflow from Corragaun Lough. The southern section of the Dooaghtry sub-site occurs to the south-east of Dooaghtry machair at Trawleckachoolia Bay. ASM occupies only a small proportion of the Aasleagh Falls sub-site and is generally poorly developed with only small fragments present. See the coastal habitats supporting document for further details. NB further unsurveyed areas may be present within the SAC
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 (2007) and McCorry and Ryle (2009). There have been significant changes to the seaward side of Corragaun Lough and the channel connecting it to the sea. Up to half of the lough (classified as a lagoon) has in-filled by sand accretion. See the coastal habitats supporting document and the conservation objective for coastal lagoons (1150) for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes including erosion and succession	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the northern section of the Dooaghtry sub-site, the saltmarsh topography is poorly developed, with few salt pans and creeks. The ASM saltmarsh in the main part of the southern section of the Dooaghtry sub-site has an excellent creek and salt pan structure. The saltmarsh topography of the ASM in the Aasleagh Falls sub-site is poorly developed, which is typical of these small fragments of saltmarsh. See the coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry (2007) and McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007) and McCorry and Ryle (2009). The largest area of saltmarsh in the northern section of the Dooaghtry sub-site is part of a large flat coastal plain and there is a gradual transition to machair vegetation communities towards the west. In the ASM habitat in the Aasleagh Falls sub-site, typical zonation of the shoreline is poorly developed. There are natural transitions to other coastal habitats at both the lower and upper ASM boundaries. See the coastal habitats supporting document for further details

Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007) and McCorry and Ryle (2009). The northern section of the Dooaghtry sub-site around the seaward side of Corragaun Lough is badly affected by overgrazing from sheep. The ASM sward height in the Aasleagh Falls sub-site varies between 1-10cm high and is light to moderately grazed overall. See the 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 the area outside of creeks vegetated	Based on data from McCorry (2007) and McCorry and Ryle (2009). The northern section of the Dooaghtry sub-site has undergone damage caused by heavy overgrazing by sheep and by vehicle wheel ruts. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in McCorry and Ryle (2009)	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the Dooaghtry sub-site, ASM saltmarsh vegetation is dominated by saltmarsh rush ( <i>Juncus gerardii</i> ) and sea milkwort ( <i>Glaux maritima</i> ), with sea plantain ( <i>Plantago maritima</i> ), buck's-horn plantain ( <i>P. coronopus</i> ), common saltmarsh-grass ( <i>Puccinellia maritima</i> ), red fescue ( <i>Festuca rubra</i> ), thrift ( <i>Armeria maritima</i> ), sea arrowgrass ( <i>Triglochin maritimum</i> ), creeping bent ( <i>Agrostis stolonifera</i> ), brookweed ( <i>Samolus valerandi</i> ) and sea arrowgrass ( <i>Triglochin maritimum</i> ). Species diversity in the ASM was typical of the habitat in the Aasleagh Falls sub-site. Turf fucoids, an indicator of local distinctiveness, were recorded at several locations in the ASM habitat; this is fairly typical of fringe type saltmarshes along the west coast of Ireland. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - <i>Spartina anglica</i>	Hectares	There is no record of common cordgrass ( <i>Spartina anglica</i> ) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). The SMP did not record common cordgrass ( <i>Spartina anglica</i> ) in the Dooaghtry or Aasleagh Falls sub-sites. See the 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 Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites (Dooaghtry and Aasleagh Falls) and potential areas mapped: 3.36ha. See map 4	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). Two sub-sites that support Mediterranean salt meadows (MSM) were mapped, Dooaghtry (SMP site ID: SMP0010) - 1.13ha and Aasleagh Falls (SMP site ID: SMP0106) - 2.2ha, and additional areas of potential MSM habitat (0.03ha) were identified from an examination of aerial photographs, giving a total estimated area of 3.36ha within Mweelrea/Sheeffry/Erriff Complex SAC. NB further unsurveyed areas may be present within the SAC. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 4 for mapped and potential distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the Dooaghtry sub-site, MSM habitat is predominantly present in the southern section and is mainly located along the landward boundary. MSM dominates the saltmarsh in the Aasleagh Falls sub-site. See the coastal habitats supporting document for further details. NB further unsurveyed areas may be present within the SAC
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 (2007) and McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes including erosion and succession	Based on data from McCorry (2007) and McCorry and Ryle (2009). There are few creeks and pans within the MSM habitat in the Dooaghtry sub-site. The saltmarsh topography of the MSM in the Aasleagh Falls sub-site is also poorly developed, although there are some small creeks present in the most extensive area. See the coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry (2007) and McCorry and Ryle (2009). Mediterranean salt meadow is found high up in the saltmarsh but requires occasional tidal inundation. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the Dooaghtry sub-site, the MSM is generally located at the back of the southern saltmarsh area and there are only narrow patches of transitional (brackish and freshwater marsh) habitats before the development of terrestrial habitats as the slope is relatively steep at the back of the saltmarsh. Shoreline zonation is relatively poorly developed in the MSM habitat in the Aasleagh Falls sub-site. There are natural transitions to other coastal habitats at both the lower and upper MSM boundaries. See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the Dooaghtry sub-site, the sward height is varied in the sea rush ( <i>Juncus maritimus</i> ) dominated MSM areas. The sward height of the MSM in the Aasleagh Falls sub-site is typical of the habitat and varies between 5-10cm. See the 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 the area outside of creeks vegetated	Based on data from McCorry (2007) and McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in McCorry and Ryle (2009)	Based on data from McCorry (2007) and McCorry and Ryle (2009). In the MSM habitat in the southern section of the Dooaghtry sub-site, species diversity within the clumps of sea rush ( <i>Juncus maritimus</i> ) is relatively high. Other species that occur frequently amongst the sea rush include red fescue ( <i>Festuca rubra</i> ), thrift ( <i>Armeria maritima</i> ), autumn hawkbit ( <i>Leontodon autumnalis</i> ), sea plantain ( <i>Plantago maritima</i> ) and white clover ( <i>Trifolium repens</i> ). The MSM habitat in the Aasleagh Falls sub-site contained a typical species assemblage with the vegetation generally being dominated by sea rush and frequent creeping bent ( <i>Agrostis stolonifera</i> ). Turf fucooids were also recorded in the MSM habitat. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - <i>Spartina anglica</i>	Hectares	There is no record of common cordgrass ( <i>Spartina anglica</i> ) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). The SMP did not record common cordgrass ( <i>Spartina anglica</i> ) in the Dooaghtry or Aasleagh Falls sub-sites. See the coastal habitats supporting document for further details

**2110 Embryonic shifting dunes**

**To maintain the favourable conservation condition of Embryonic shifting dunes in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Dooaghtry - 0.53ha. See map 5	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Embryonic shifting dunes habitat was mapped at the sub-site Dooaghtry (SDM site ID: 108) to give a total estimated area of 0.53ha within Mweelrea/Sheeffry/Erriff Complex SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 5 for recorded distribution	Based on data from Delaney et al. (2013). Embryonic shifting dunes were recorded in two small areas at Dooaghtry. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from 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. Coastal defences are present close to the outflow of the Owenadornaun River, but these appear to be longstanding structures. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch grass ( <i>Elytrigia juncea</i> ) and/or lyme-grass ( <i>Leymus arenarius</i> ) 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). All of the shoots of sand couch grass ( <i>Elytrigia juncea</i> ) were healthy in the habitat in the SAC at the time of the SDM survey. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch grass ( <i>Elytrigia juncea</i> ) and/or lyme-grass ( <i>Leymus arenarius</i> )	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), 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 ( <i>Hippophae rhamnoides</i> ) should be absent or effectively controlled. See the coastal habitats supporting document for further details

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

**To maintain the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Dooaghtry - 12.43ha. See map 5	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Shifting dunes along the shoreline with <i>Ammophila arenaria</i> was mapped at the sub-site Dooaghtry (SDM site ID: 108) to give a total estimated area of 12.43ha within Mweelrea/Sheeffry/Erriff Complex SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 5 for recorded distribution	Based on data from Delaney et al. (2013). There is a wide band of marram ( <i>Ammophila arenaria</i> ) dunes along the western side of the dunes at Dooaghtry and for much of the sub-site the habitat fronts directly onto the beach. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass ( <i>Ammophila arenaria</i> ) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass ( <i>Ammophila arenaria</i> ) and/or lyme-grass ( <i>Leymus arenarius</i> ) 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 the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass ( <i>Ammophila arenaria</i> ) and/or lyme-grass ( <i>Leymus arenarius</i> )	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), 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 ( <i>Hippophae rhamnoides</i> ) should be absent or effectively controlled. See the coastal habitats supporting document for further details

**2150 Atlantic decalcified fixed dunes (Calluno-Ulicetea)**

**To maintain the favourable conservation condition of Atlantic decalcified fixed dunes (Calluno-Ulicetea)\* in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Atlantic decalcified fixed dunes habitat was not recorded by the SDM in the Dooaghtry sub-site. The current status of this habitat in Ireland is under review. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes	The current distribution and status of the habitat in the SAC is unknown. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10%, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: sward height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), 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 ( <i>Hippophae rhamnoides</i> ) should be absent or effectively controlled. See the coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details



**2170 Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae)**

**To maintain the favourable conservation condition of Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (Salix arenariae) was not recorded by the SDM in the Dooaghtry sub-site. The current area and status of this habitat in the SAC is unknown. The habitat can be difficult to distinguish from 2190 Humid dune slacks. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes	The current distribution and status of the habitat in the SAC is unknown. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% cover, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	See the coastal habitats supporting document for further details
Vegetation composition: cover and height of <i>Salix repens</i>	Percentage cover; centimetres	Maintain more than 10% cover of creeping willow ( <i>Salix repens</i> ); vegetation height should be in the average range of 5-20cm	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Cover of creeping willow ( <i>Salix repens</i> ) needs to be maintained (e.g. through an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	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 ( <i>Hippophae rhamnoides</i> ) should be absent or effectively controlled. See the coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	For trees and scrub other than creeping willow ( <i>Salix repens</i> ), there should be no more than 5% cover or their presence should be under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details

## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 21A0 Machairs (\* in Ireland)

**To restore the favourable conservation condition of Machairs (\* in Ireland) in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Dooaghtry - 137.01ha. See map 5	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Machair was recorded and mapped from the sub-site Dooaghtry (SDM site ID: 108) to give a total estimated area of 137.01ha within Mweelrea/Sheeffry/Erriff Complex SAC. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 5 for recorded distribution	Based on data from Delaney et al. (2013). Machair is the most extensive coastal Annex I habitat at Dooaghtry. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime	Based on data from Crawford et al. (1998), Gaynor (2006), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). In this SAC, machair grades into saltmarsh towards the tidal inlet and to different fen types as it approaches the open water of the lough at Carrickskeewaun. See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of the machair habitat, subject to natural processes	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Rabbits, cattle and sheep graze the machair at Dooaghtry. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Typical machair species present include creeping bent ( <i>Agrostis stolonifera</i> ), daisy ( <i>Bellis perennis</i> ), sand sedge ( <i>Carex arenaria</i> ), glaucous sedge ( <i>C. flacca</i> ), common mouse-ear ( <i>Cerastium fontanum</i> ), lady's bedstraw ( <i>Galium verum</i> ), fairy flax ( <i>Linum catharticum</i> ), common bird's-foot trefoil ( <i>Lotus corniculatus</i> ), red bartsia ( <i>Odontites vernus</i> ), ribwort plantain ( <i>Plantago lanceolata</i> ), selfheal ( <i>Prunella vulgaris</i> ) and white clover ( <i>Trifolium repens</i> ). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), 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. The presence of perennial rye grass ( <i>Lolium perenne</i> ) in places throughout the machair in the SAC is indicative of agricultural improvement. See the coastal habitats supporting document for further details

Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009) and Delaney et al. (2013). The mosses <i>Climacium dendroides</i> , <i>Homalothecium lutescens</i> , <i>Rhytidiadelphus triquetrus</i> , <i>Thuidium tamariscinum</i> and <i>Syntrichia ruralis</i> subsp. <i>ruraliformis</i> have been recorded from the machair. Petalwort ( <i>Petalophyllum ralfsii</i> ), a liverwort species listed on Annex II of the EU Habitats Directive and on the Flora (Protection) Order, 2015, has also been recorded on the machair in this SAC (Campbell et al., 2015). See the conservation objective for petalwort (1395) and the 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 Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Lake habitat 3110 is considered likely to occur in most lakes in Mweelrea/Sheeffry/Erriff Complex SAC, from upland corrie lakes such as Loughs Glenawough, Lugacliwee and Bellawaum (where it may co-occur with habitat 3160) to lowland lakes such as Doo, Glencullin and Tawnyard Loughs. It may also co-occur with habitat 3160 in lakes in blanket bog, and with habitat 3130 in Lough Nahaltora and Fin Lough. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha were mapped as potential 3110 (see map 6). It is likely, however, that the habitat also occurs in smaller lakes and ponds. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, all lakes larger than 1ha have been mapped as potential 3110, but the habitat is likely to be even more widespread in the SAC (see map 6)
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see the Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for <i>Najas flexilis</i> for information on Lough Nahaltora in the SAC. Information on Fin Lough can be found in Roden and Murphy (2014). Glencullin and Doo Loughs are Water Framework Directive (WFD) monitoring lakes and regular macrophyte surveys are conducted by the Environmental Protection Agency (EPA)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3110 (see O Connor, 2015). Lake-specific information on vegetation zonation may be available from sources such as Roden (2004, 2007 in NPWS, 2007), Roden and Murphy (2014), EPA surveys and others
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3110. Maximum depth should be large in lakes in the SAC within undisturbed peatland and uplands; however, pressures such as overgrazing, forestry and peat-cutting may have reduced vegetation depth in some lakes

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, drainage and overgrazing. 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. It is possible that the hydrological regimes of some of the lakes in this SAC have been altered by historic overgrazing (faster run-off, higher flood peaks, lower base flows, etc.; see Marshall et al., 2014)
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 lake habitat 3110 is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. Substratum particle size is likely to vary with depth and along the shoreline within a single lake
Water quality: transparency	Metres	Maintain/restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3110 (O Connor, 2015). Lake habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of $\geq 6\text{m}$ annual mean Secchi disk depth, and $\geq 3\text{m}$ annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Free et al. (2006) give Secchi depth of 2.9m in Glencullin, 5.6m in Doo and 5.8m in Fin Loughs in this SAC
Water quality: nutrients	$\mu\text{g/l P}$ ; $\text{mg/l N}$	Maintain/restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and 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 lake habitat 3110, annual average total phosphorus (TP) concentration should be $\leq 10\mu\text{g/l TP}$ , average annual total ammonia concentration should be $\leq 0.040\text{mg/l N}$ and annual 95th percentile for total ammonia should be $\leq 0.090\text{mg/l N}$ . See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Glencullin and Doo Loughs had high nutrient status in 2010-12 (Bradley et al., 2015). Both lakes had failed in 2007-09, however, having good nutrient status and TP $> 10\mu\text{g/l}$ (McGarrigle et al., 2010)
Water quality: phytoplankton biomass	$\mu\text{g/l Chlorophyll } a$	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll <i>a</i> concentration must be $< 5.8\mu\text{g/l}$ . The annual average chlorophyll <i>a</i> concentration should be $< 2.5\mu\text{g/l}$ and the annual peak chlorophyll <i>a</i> concentration should be $\leq 8.0\mu\text{g/l}$ . See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Glencullin and Doo Loughs had high status in 2007-2009 and 2010-2012 (McGarrigle et al., 2010; Bradley et al., 2015)

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, lake habitat 3110 requires WFD high status. Glencullin and Doo Loughs had high phytoplankton composition status in 2010-12 (Bradley et al., 2015)
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 lake habitat 3110 should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3110 requires high phytobenthos status. Glencullin and Doo Loughs had high phytobenthos status in 2010-12 (Bradley et al., 2015)
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 lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of $\geq 0.90$ , as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Glencullin and Doo Loughs had high macrophyte status in 2007-2009 and 2010-2012 (McGarrigle et al., 2010; Bradley et al., 2015)
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 <i>Sphagnum</i> mosses and <i>Juncus bulbosus</i> (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 lake habitat 3110, and adopting a precautionary approach based on Arts (2002), minimum pH should not be <5.5 pH units. Maximum pH should be <9.0 pH units, in line with the surface water standards established for soft waters (where water hardness is $\leq 100$ mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Glencullin and Doo Loughs passed for acidification status in the 2007-09 and 2010-12 periods (McGarrigle et al., 2010; Bradley et al., 2015)
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l or even <10mg/l PtCo) in lake habitat 3110, where the peatland in the lake's catchment is intact. Free et al. (2006) reported colour of 17mg/l, 8mg/l and 10mg/l PtCo in Glencullin, Doo and Fin Loughs, respectively. Roden (2004) stated the water in Lough Nahaltora was coloured/peat-stained. Overgrazing, peat-cutting or other peatland damage may have increased colour in some lakes in the SAC

Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc. Overgrazing and other peatland degradation is also likely to have increased DOC in some lakes in Mweelrea/Sheeffry/Erriff Complex SAC
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. Increased loads of fine organic and inorganic particles from overgrazing may have increased turbidity in lakes in the SAC
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. In this SAC, lake shorelines are likely to have acid grassland, swamp, heath, blanket bog and rock communities. 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

**3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea**

**To maintain the favourable conservation condition of Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Lake habitat 3130 is considered likely to occur in Lough Nahaltora in Mweelrea/Sheeffry/Erriff Complex SAC, which has a population of <i>Najas flexilis</i> (slender naiad). It may also occur in Fin Lough and other lakes in the SAC, particularly those on more base-rich geology or near the coast (see map 6). It is likely to co-occur with lake habitat 3110 in these lakes. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015). See also the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for <i>Najas flexilis</i>
Habitat distribution	Occurrence	No decline, subject to natural processes	The characteristics and distribution of lake habitat 3130 in Ireland are not yet fully understood. The Annex II macrophyte <i>Najas flexilis</i> (slender naiad) is considered to be characteristic of the habitat and occurs in Lough Nahaltora (see map 6). As noted above, the habitat may be more widespread in the SAC. See O Connor (2015) and the <i>Najas flexilis</i> conservation objectives supporting document for further information
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see the Article 17 habitat assessment for 3130 (NPWS, 2013), O Connor (2015) and the <i>Najas flexilis</i> conservation objectives supporting document for further information
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3130 (see O Connor, 2015). Lake-specific information on vegetation zonation may be available from Roden (2004, 2007 in NPWS 2007), Roden and Murphy (2014), Environmental Protection Agency (EPA) surveys or other sources
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3130. Maximum depth should be large in lakes in the SAC within undisturbed peatland and uplands; however, pressures such as overgrazing, forestry and peat-cutting may have reduced vegetation depth in some lakes



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, drainage and overgrazing. 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. It is possible that the hydrological regimes of some of the lakes in Mweelrea/Sheeffry/Erriff Complex SAC have been altered by historic overgrazing (faster run-off, higher flood peaks, lower base flows, etc.; see Marshall et al. (2014))
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 lake habitat 3130 is associated with a range of substrate types that are more productive/base-rich relative to the substratum of lake habitat 3110. Substratum particle size is likely to vary with depth and along the shoreline within a single lake; however, it should be noted that <i>Najas flexilis</i> is typically found on soft substrata of mud, silt or fine sand (Preston and Croft, 2001; Roden, 2002, 2004). For further information see the lake habitats supporting document (O Connor, 2015) and the <i>Najas flexilis</i> conservation objectives supporting document
Water quality: transparency	Metres	Maintain/restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3130 (O Connor, 2015). Habitat 3130 is associated with clear water, as evidenced by the growth of the character species <i>Najas flexilis</i> at depths of up to 10m. There is likely to be some variation in Secchi depth across lakes with habitat 3130 and site-specific conditions should also be considered. The OECD fixed boundary system set transparency targets for oligotrophic lakes of $\geq 6\text{m}$ annual mean Secchi disk depth, and $\geq 3\text{m}$ annual minimum Secchi disk depth. Roden (2004, 2007 in NPWS, 2007) stated Lough Nahaltora had moderate visibility and peat-stained water. Free et al. (2006) recorded Secchi depth of 5.8m in Fin Lough. Roden and Murphy (2014) stated Fin Lough had very clear water
Water quality: nutrients	$\mu\text{g/l P}$ ; $\text{mg/l N}$	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	Lake habitat 3130 is associated with high water quality, with naturally low dissolved nutrients. It is naturally more productive than 3110, probably reflecting higher concentrations of nutrients such as calcium, rather than P alone. Lake habitat 3130 may reach favourable condition slightly above the oligotrophic boundary for nutrients, but in the absence of habitat-specific targets, the targets are Water Framework Directive (WFD) 'High Status' or oligotrophic (OECD, 1982). The "good-moderate" boundary is too enriched to support the habitat. Annual average total phosphorus (TP) concentration should be $\leq 10\mu\text{g/l TP}$ , average annual total ammonia concentration should be $\leq 0.040\text{mg/l N}$ and annual 95th percentile for total ammonia should be $\leq 0.090\text{mg/l N}$ . Where nutrient concentrations are lower, there should be no upward trend in nutrient concentration. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009

Water quality: phytoplankton biomass	µg/l Chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Lake habitat 3130 is associated with high water quality, and naturally low algal growth. As for nutrients, the targets are WFD 'High Status' or oligotrophic (OECD, 1982). The "good-moderate" boundary is too enriched to support the habitat. The average growing season (March-October) chlorophyll <i>a</i> concentration must be <5.8µg/l. The annual average chlorophyll <i>a</i> concentration should be <2.5µg/l and the annual peak chlorophyll <i>a</i> concentration should be ≤8.0µg/l. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3130 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 habitat 3130 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 3130 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 lake habitat 3130 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 lake habitat 3130. Acidification reduces the abundance and reproductive capacity of <i>Najas flexilis</i> (Wingfield et al., 2004). The specific requirements of habitat 3130, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. In line with targets for <i>Najas flexilis</i> , median pH values should be greater than 7 pH units. Water and sediment alkalinity and concentrations of cations (notably calcium) should be appropriate to the habitat. The target for WFD Acidification/Alkalisatation status is high. Maximum pH should be <9.0 pH units, in line with the surface water standards. See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Water colour	mg/l PtCo	Maintain/restore appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour is generally <30mg/l PtCo or, more naturally, <20mg/l PtCo in lakes with habitat 3130, where the peatland in the lake's catchment is intact. Roden (2004, 2007 in NPWS, 2007) stated the water in Lough Nahaltora was coloured/peat-stained. Free et al. (2006) reported colour of 10mg/l PtCo in Fin Lough. Overgrazing, peat-cutting or other peatland damage may have increased colour in some lakes in the SAC
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc. Overgrazing and other peatland degradation is also likely to have increased DOC in some lakes in Mweelrea/Sheeffry/Erriff Complex SAC
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. Increased loads of fine organic and inorganic particles from overgrazing may have increased turbidity in lakes in the SAC
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3130	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. In this SAC, lake shorelines are likely to have acid grassland, swamp, heath, blanket bog and rock communities. Calcareous fen and machair occur around coastal lakes. 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

**3160 Natural dystrophic lakes and ponds**

**To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC has both blanket bog pool systems and upland lakes with habitat 3160. The habitat is likely to co-occur with habitat 3110 in lakes. All lakes/pools smaller than 1ha and all upland corrie lakes have been mapped as 3160 (see map 6). Many of the bog pools are not mapped in the 1:5,000 OSi data used. Bog pool systems have been recorded at Srahiroosky, Knockeen, Derrinkee, Derrintin, Derryaun, Derrycraff, Srahlea and North of Lough Glenawough (Foss and McGee, 1987; Douglas et al., 1989; Roche et al., 2014). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, all lakes and pools smaller than 1ha in area and all upland lakes have been mapped as potential 3160 (see map 6). Atlantic blanket bog pools, including interconnecting pool systems, were recorded at Srahiroosky, Knockeen, Derrinkee, Derrintin, Derryaun, Derrycraff, Srahlea and North of Lough Glenawough, and other areas of the SAC (Foss and McGee, 1987; Douglas et al., 1989). The habitat is likely to be even more widespread in the SAC as not all pools on blanket bog are mapped in the 1:5,000 OSi data
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see the Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015). See Foss and McGee (1987) and Douglas et al. (1989) for records of plant species in blanket bog pools in the SAC
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3160 (see O Connor, 2015). Spatial patterns are likely to be relatively simple in lake habitat 3160, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3160. 3160 lakes and pools naturally have very clear water and, therefore, maximum depth can be large within undisturbed peatland and uplands. Pressures such as overgrazing, forestry and peat-cutting may have reduced vegetation depth in some lakes in the SAC

Hydrological regime: water level fluctuations	Metres	Maintain/restore appropriate natural hydrological regime necessary to support the habitat	Natural water level fluctuations can be amplified by activities such as abstraction, drainage and overgrazing. Increased fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. The hydrological regime of 3160 lakes and pools is integrally linked to that of the surrounding blanket bog, transition mire/quaking bog and other peatland habitats. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage. It is likely that the hydrological regimes of lakes and pools may still be altered owing to historic overgrazing (faster run-off, higher flood peaks, lower base flows, etc.; see Marshall et al., 2014)
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Lake habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of $\geq 12\text{m}$ annual mean Secchi disk depth, and $\geq 6\text{m}$ annual minimum Secchi disk depth
Water quality: nutrients	$\mu\text{g/l P}$ ; $\text{mg/l N}$	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For 3160 lakes and pools, annual average total phosphorus (TP) concentration should be $\leq 5\mu\text{g/l TP}$ , average annual total ammonia concentration should be $\leq 0.040\text{mg/l N}$ and annual 95th percentile for total ammonia should be $\leq 0.090\text{mg/l N}$ . See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	$\mu\text{g/l Chlorophyll } a$	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Oligotrophic and WFD 'high' status targets apply to habitat 3160. The average growing season (March-October) chlorophyll <i>a</i> concentration must be $< 5.8\mu\text{g/l}$ (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll <i>a</i> concentration $< 1\mu\text{g/l}$ and annual peak chlorophyll <i>a</i> concentration $\leq 2.5\mu\text{g/l}$ . See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status

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

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain/restore 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. Increased loads of fine organic and inorganic particles from overgrazing may have increased turbidity in lakes in the SAC
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	3160 pools intergrade with blanket bog communities in Mweelrea/Sheeffry/Erriff Complex SAC. Spring-fed flushes are a also a feature of the SAC, as is quaking bog. Lakes with 3160, particularly in uplands, are likely to be fringed by acid grassland, heath and rock communities. Fringing habitats support the structure and functions of the lake/pool habitat. Equally, fringing habitats are dependent on the lake/pool, particularly its water levels, and can support wetland communities and species of conservation concern

## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	Conservation objectives concentrate on the high conservation value sub-types of the habitat. Selection of the SAC used a broad interpretation and the habitat's full distribution and sub-types are not yet documented. Rivers in the SAC are naturally highly oligotrophic and species-poor; rare and threatened river bryophytes and lichens indicate high conservation value. Upland streams in particular deserve further study. Note: rooted macrophytes should be trace/absent (<5% cover) in freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) habitat. The SAC contains the priority freshwater pearl mussel Bundorragha catchment, one of the world's most important pearl mussel rivers. The freshwater pearl mussel (1029) conservation objective takes precedence over the 3260 objective in the Bundorragha in this SAC because the mussel requires environmental conditions closer to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes	Further study of Irish rivers is needed to interpret the broad description of habitat 3260 which covers upland bryophyte/macroalgal dominated to lowland depositing rivers with pondweeds and starworts (European Commission, 2013). The rivers in the SAC are naturally very nutrient-poor. The Bundorragha and upland rivers/streams are of particular interest. The upland rivers/streams require further investigation. Heuff (1987) surveyed the Erriff. Some information on the Bundorragha is available from NPWS (2010) and Williams (2009) (see also the conservation objective for the freshwater pearl mussel ( <i>Margaritifera margaritifera</i> )). Lockhart et al. (2012) provide information on bryophytes. The SAC contains a number of high status river sites (see McGarrigle et al., 2010; Ní Chatháin et al., 2013; Bradley et al., 2015)
Hydrological regime: river flow	Metres per second	Maintain/restore appropriate hydrological regimes	High conservation value sub-types are associated with natural hydrological regimes. A natural flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For many sub-types of the habitat, high flows are required to maintain the substratum necessary for the characteristic species. Flow variation can be particularly important, with high and flood flows being critical to the hydromorphology. Other aspects of hydrology, such as tidal regime, are important for certain sub-types of the habitat. The hydrological regimes of some of the SAC's rivers, particularly in the Erriff system, may have been altered by overgrazing and peat erosion (faster run-off, higher flood peaks, lower base flows, etc.; see Marshall et al. (2014))
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regime	Even small groundwater contributions can significantly alter hydrochemistry, particularly where there is basic bedrock and/or subsoils. Freshwater seepages can be very important in tidal reaches



Substratum composition: particle size range	Millimetres	Maintain/restore appropriate substratum particle size range, quantity and quality, subject to natural processes	Although many of the high conservation value sub-types of the habitat are dominated by coarse substrata and bedrock, certain sub-types, notably those associated with lake inflows/outflows and peatlands, are dominated by fine substrata. The size and distribution of particles is largely determined by the river flow and geology. The chemical composition (particularly minerals and nutrients) of the substratum is also important. The quality of finer sediment particles is a notable driver for rooted plant communities. Increased loads of fine organic and inorganic particles arising from drainage, overgrazing and other peatland degradation is likely to have increased the fine sediment load to rivers in the SAC, particularly the Erriff
Water quality	Various	Maintain/restore appropriate water quality to support the natural structure and functioning of the habitat	The specific targets may vary among sub-types. The rivers within the SAC are naturally very nutrient-poor and require Water Framework Directive high status, in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos. High status targets apply to freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) habitat in the Bundorragha (see The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009). Overgrazing, peat-cutting or other peatland damage may have increased ammonia, colour, fine sediment, DOC (dissolved organic carbon) and other pollutant loads to rivers such as the Erriff in the SAC. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009, Environmental Protection Agency (EPA) river water quality reports (e.g. Bradley et al., 2015) and Ní Chatháin et al. (2013)
Typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	Typical species have not yet been fully defined. Heuff (1987) recorded typical oligotrophic, base-poor species in the Erriff including <i>Fissidens viridulus</i> , <i>Fontinalis squamosa</i> , <i>Juncus bulbosus</i> , <i>Myriophyllum alterniflorum</i> and <i>Potamogeton natans</i> . <i>Callitriche hermaphroditica</i> , <i>C. stagnalis</i> , <i>J. bulbosus</i> , <i>M. alterniflorum</i> and <i>P. polygonifolius</i> were recorded in the Bundorragha in 2014 (M. Wyse Jackson, pers. comm.). Red-listed bryophytes in/near rivers include <i>Hygrohypnum duriusculum</i> (CR) (fast-flowing upland stream, Mweelrea); <i>Bryum riparium</i> (EN) and <i>Fissidens serrulatus</i> (VU) (Lockhart et al., 2012). Scarce lichens recorded in the Erriff include <i>Dermatocarpon meiophyllizum</i> , <i>Catillaria chalybeia</i> var. <i>chloropoliza</i> , <i>Pertusaria excludens</i> and <i>Porpidia hydrophila</i> (NPWS internal files). Giavarini (2009) recorded <i>Dermatocarpon luridum</i> , <i>Lecidea lithophila</i> and <i>Porpidia hydrophila</i> in the Bundorragha
Floodplain connectivity: area	Hectares	The area of active floodplain at and upstream of the habitat should be maintained	River connectivity with the floodplain is important for the functioning of this habitat. Channels with a naturally functioning floodplain are better able to maintain habitat and water quality (Hatton-Ellis and Grieve, 2003). Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition. High conservation value rivers are intimately connected to floodplain habitats and function as important wildlife corridors, connecting otherwise isolated or fragmented habitats in the wider countryside (Hatton-Ellis and Grieve, 2003; Mainstone et al., 2016)

Riparian habitat: Hectares  
area and condition

Maintain the area and  
condition of fringing  
habitats necessary to  
support the habitat and its  
sub-types

Riparian habitats, including those along lakes, e.g. woodlands and wetlands, are integral to the structure and functioning of rivers, even where not part of a floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine sediment, protect banks from erosion and contribute to nutrient cycling. Shade may be important in suppressing algal growth and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. See Mainstone et al. (2016). Semi-natural grassland and peatland are a feature of many rivers in the SAC. *Erica erigena* occurs along streams to the N. of Killary. *Carex aquatilis* is found along Erriff. The upland streams are associated with flushes and other important habitats

---

**4010 Northern Atlantic wet heaths with *Erica tetralix***

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Northern Atlantic wet heaths with <i>Erica tetralix</i> was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 4,861.9ha, covering 23.2% of the SAC. Roche et al. (2014) report obvious losses of the habitat since 1995 of approximately 1.46ha. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology and a brief discussion of restoration potential are also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7	Roche et al. (2014) recorded wet heaths throughout the SAC, including to the north-west of the main ridge of the Sheeffry Hills, the northern hill of Tangincartoor and the neighbouring ridge of Laghta Eighter, the slopes of Ben Gorm and Ben Creggan, the northern lip of the Glenawough valley, the lower flanks of the Mweelrea Mountains and the lower lying lands of the Erriff valley and around Cregganbaun. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded six different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of monitoring stops	Cross-leaved heath ( <i>Erica tetralix</i> ) present within a 20m radius of each monitoring stop	Attribute and target based on Perrin et al. (2014)
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of <i>Cladonia</i> and <i>Sphagnum</i> species, <i>Racomitrium lanuginosum</i> and pleurocarpous mosses at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry ( <i>Empetrum nigrum</i> ) at least 15%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native moss <i>Campylopus introflexus</i> was recorded in 8.6% of the wet heath monitoring stops, but its cover was not sufficient to cause the stops to fail. Rhododendron ( <i>Rhododendron ponticum</i> ) has a localised distribution within habitat 4010 in the SAC. Further information can be found in Roche et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken ( <i>Pteridium aquilinum</i> ) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush ( <i>Juncus effusus</i> ) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry ( <i>Empetrum nigrum</i> ) and bog-myrtle ( <i>Myrica gale</i> ) showing signs of browsing	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection) Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. The Near Threatened and FPO listed liverwort <i>Mastigophora woodsii</i> and the Near Threatened moss <i>Sphagnum subsecundum</i> (Lockhart et al., 2012) can be attributed specifically to wet heath in the SAC (Roche et al., 2014)

**4030 European dry heaths**

**To restore the favourable conservation condition of European dry heaths in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). European dry heaths was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 359.8ha, covering 1.7% of the SAC. Roche et al. (2014) report obvious losses of the habitat since 1995 of approximately 0.08ha. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology and a brief discussion of restoration potential are also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8	Roche et al. (2014) recorded dry heaths throughout the SAC, with the main areas being the drier tops of Tangincartoor and the neighbouring ridge at Laghta Eighter. It also occurs on the back wall of the Glenawough corrie and on the slopes of the large broad valley of Laghta Ougher, north of the main Sheeffry Hills ridge. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded six different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding <i>Campylopus</i> and <i>Polytrichum</i> mosses	Attribute and target based on Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least two	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented
Vegetation composition: dwarf shrub composition	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of dwarf shrub cover composed collectively of bog-myrtle ( <i>Myrica gale</i> ), creeping willow ( <i>Salix repens</i> ) and western gorse ( <i>Ulex gallii</i> ) is less than 50%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native moss <i>Campylopus introflexus</i> was recorded within one dry heath monitoring stop, but its cover was not sufficient to cause the stop to fail. Further information can be found in Roche et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken ( <i>Pteridium aquilinum</i> ) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush ( <i>Juncus effusus</i> ) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling ( <i>Calluna vulgaris</i> ) cover less than 50%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids and crowberry ( <i>Empetrum nigrum</i> ) showing signs of browsing	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Vegetation structure: growth phases of ling	Percentage cover in local vicinity of a representative number of monitoring stops	Outside sensitive areas, all growth phases of ling ( <i>Calluna vulgaris</i> ) should occur throughout, with at least 10% of cover in the mature phase	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. During the NSUH, the Near Threatened and FPO listed liverwort species <i>Mastigophora woodsii</i> and the Vulnerable and FPO liverworts <i>Bazzania pearsonii</i> and <i>Scapania ornithopodioides</i> (Lockhart et al., 2012) were recorded within a hepatic mat on dry heath. There is a historic record for the Vulnerable and FPO listed species small-white orchid ( <i>Pseudorchis albida</i> ) (Wyse Jackson et al., 2016) from the SAC, but this species cannot be attributed specifically to dry heaths (Roche et al., 2014)

**4060 Alpine and Boreal heaths**

**To restore the favourable conservation condition of Alpine and Boreal heaths in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Alpine and Boreal heaths was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 148.7ha, covering 0.7% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 9	Roche et al. (2014) recorded Alpine and Boreal heaths on high ground across the SAC, including the summit plateau of the Sheeffry Hills, the summits of Tangincartoor and the neighbouring ridge of Laghta Eighter, above the Glenawough corrie, the northern side of the Mweelrea Mountains and close to the summits of Ben Creggan and Ben Gorm. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded four different Alpine and Boreal heath vegetation communities within this SAC. Data on the abundance of these communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three	Attribute and target based on Perrin et al. (2014)
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 66%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrub species at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 10%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native moss <i>Campylopus introflexus</i> was recorded within one Alpine and Boreal heath monitoring stop, but its cover was not sufficient to cause the stop to fail. Further information can be found in Roche et al. (2014)

Vegetation structure: signs of grazing	Percentage of leaves grazed at a representative number of 2m x 2m monitoring stops	Less than 10% collectively of the live leaves of specific graminoids showing signs of grazing	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of specific graminoids
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids and crowberry ( <i>Empetrum nigrum</i> ) showing signs of browsing	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning within the habitat	Attribute and target based on Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute



**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 Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	<i>Juniperus communis</i> formations on heath or calcareous grasslands has not been mapped in detail in Mweelrea/Sheeffry/Erriff Complex SAC and thus the total area of the qualifying habitat in the SAC is unknown. The habitat was not recorded during the National Survey of Upland Habitats (Roche et al., 2014), although <i>Juniperus communis</i> was recorded as a component of habitat 4060. Douglas et al. (1989) also recorded the species in the middle of Knockeen Bog in the north-west of the SAC, where it occurs both on small islands in pools and in flat areas of blanket bog (7130*) between the pools. The habitat may occur in Creganawoody townland in the north-west of the SAC, where juniper has been recorded on shallow peat, where there is much outcropping rock (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for habitat area above
Juniper population size	Number per formation	At least 50 plants per formation	To classify as a juniper ( <i>Juniperus communis</i> ) formation, at least 50 plants should be present (Cooper et al., 2012)
Vegetation composition: typical species	Number per formation	At least 50% of the listed positive indicator species for the relevant vegetation group present	Attribute and target based on Cooper et al. (2012), where positive indicator species for five vegetation groups are listed
Vegetation composition: negative indicator species	Occurrence per formation	Negative indicator species, particularly non-native invasive species, absent or under control	Attribute and target based on Cooper et al. (2012), where the list of negative indicator species is presented
Vegetation structure: cone-bearing plants	Percentage per formation	At least 10% of juniper plants are bearing cones	Attribute and target based on Cooper et al. (2012)
Vegetation structure: seedling recruitment	Percentage per formation	At least 10% of juniper plants are seedlings	Attribute and target based on Cooper et al. (2012)
Vegetation structure: dead juniper	Percentage per formation	Mean percentage of each juniper plant dead less than 10%	Attribute and target based on Cooper et al. (2012)

## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels habitat was recorded in an upland context and was mapped in detail for the SAC by Roche et al. (2014). The total area of the qualifying habitat stated by Roche et al. (2014) is 1.5ha, covering 0.01% of the SAC. Further information can be found in Roche et al. (2014) and Perrin et al. (2014)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 10	The upland ledge type of the habitat was recorded from several corrie walls in the SAC and particularly among the Sheeffry Hills. See Roche et al. (2014) for further details
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat (NPWS, 2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded one tall herb community of rocky upland ledges within this SAC. Further information on the vegetation communities associated with this habitat can be found in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of monitoring stops	At least one positive indicator species at each monitoring stop	The list of positive indicator species for the upland type community can be found in the Article 17 habitat assessment for 6430 (NPWS, 2013). See Roche et al. (2014) and Perrin et al. (2014) for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species is at least 25%	The list of positive indicator species for the upland type community can be found in the Article 17 habitat assessment for 6430 (NPWS, 2013). See Roche et al. (2014) and Perrin et al. (2014) for further details
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species less than 1%	See NPWS (2013), Roche et al. (2014) and Perrin et al. (2014) for further details
Vegetation structure: height/flowering	Percentage/occurrence at a representative number of monitoring stops	At least 50% of tall herb stems should be greater than 20cm tall or signs of flowering/ability to flower should be present	See NPWS (2013), Roche et al. (2014) and Perrin et al. (2014) for further details
Vegetation structure: grazing	Percentage of flowering tall herb shoots grazed at a representative number of monitoring stops	Live shoots of flowering tall herb shoots showing signs of grazing less than 50%	See NPWS (2013), Roche et al. (2014) and Perrin et al. (2014) for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground in monitoring stop less than 25% and less than 10% in local vicinity of monitoring stop	See NPWS (2013), Roche et al. (2014) and Perrin et al. (2014) for further details

Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute
-------------------------------------	--------------------------------	--	--

---

**7130 Blanket bogs (\* if active bog)**

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Blanket bog was mapped in detail and the total area of the qualifying habitat stated by Roche et al. (2014) is 4523ha, covering 21.6% of the SAC. This comprises 4287.7ha of active blanket bog and 236.3ha of inactive blanket bog. Roche et al. (2014) report obvious losses of approximately 2.2ha since 1995. However, this is almost certainly an underestimate as chronic losses due to erosion since 1995 cannot be quantified (495.9ha were mapped as eroding blanket bog by Roche et al. (2014)). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 11	Roche et al. (2014) recorded blanket bog throughout the SAC including the large broad valley of Laghta Oughter, the lower ground surrounding Laghta Eighter and Tangincartoor, lower areas around the massif in the vicinity of Ben Gorm and Ben Creggan, within and above the Glenawough valley and in the lowlands of the Erriff valley and around Cregganbaun. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document where a summary of the mapping methodology is presented
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	From the habitat areas given by Roche et al. (2014) above, 94.8% of the Annex I blanket bog habitat is currently actively peat-forming
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded seven active blanket bog communities within this SAC. Data on the abundance of the active blanket bog communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding <i>Sphagnum fallax</i> , at least 10%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native moss <i>Campylopus introflexus</i> formed extensive carpets within this habitat. Rhododendron ( <i>Rhododendron ponticum</i> ) was also found within the habitat in the SAC. Further information can be found in Roche et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry ( <i>Empetrum nigrum</i> ) and bog-myrtle ( <i>Myrica gale</i> ) showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: erosion	Percentage area in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute

**7140 Transition mires and quaking bogs**

**To restore the favourable conservation condition of Transition mires and quaking bogs in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Transition mires and quaking bogs was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 96.2ha, covering 0.5% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 12	Roche et al. (2014) recorded transition mires throughout the SAC, including the lower ground surrounding Laghta Eighter and Tangincartoor, Cregganbaun, Srahhroskey, Drummin West, Derrycraff and Derrintin. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded three different transition mire and quaking bog vegetation communities within this SAC. Data on the abundance of these communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least three for infilling pools and flushes and at least six for fens	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: number of core positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least one core positive indicator species present	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of positive indicator species is at least 25%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). No non-native species were recorded within this habitat during the NSUH (Roche et al., 2014)

Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples of the habitat, not to infilling pool examples
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute

**7150 Depressions on peat substrates of the Rhynchosporion**

**To restore the favourable conservation condition of Depressions on peat substrates of the Rhynchosporion in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Depressions on peat substrates of the Rhynchosporion habitat was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 406ha, covering 1.9% of the SAC. Roche et al. (2014) report obvious losses of approximately 0.01ha since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 13	Roche et al. (2014) recorded Rhynchosporion depressions throughout the SAC, including the large broad valley of Laghta Ougher, the lower ground surrounding Laghta Eighter and Tangincartoor, the land surrounding Cregganbaun, Srahrooskey and Srahlea and the land adjacent to and west of Tawnyard Lough. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: <i>Rhynchospora</i> spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge ( <i>Rhynchospora alba</i> ) and brown beaked sedge ( <i>R. fusca</i> ) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). No non-native species were recorded within this habitat during the NSUH (Roche et al., 2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: <i>Sphagnum</i> condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the <i>Sphagnum</i> cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)



Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry ( <i>Empetrum nigrum</i> ) and bog-myrtle ( <i>Myrica gale</i> ) showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: erosion	Percentage area in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute

## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 7220 Petrifying springs with tufa formation (Cratoneurion)

**To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)\* in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	A total of 3,070m <sup>2</sup> (0.307ha) of this habitat was recorded at three locations within Mweelrea/Sheeffry/Erriff Complex SAC, two at Dooaghtry Coast and one at Dooaghtry Flush, by Lyons (2015) (see map 14). The first location at Dooaghtry Coast (site ID: PS027a) was recorded as small tufa-forming springs at the upper limits of the beach with an area of c.20m <sup>2</sup> , the second at Dooaghtry Coast (site ID: PS027b) was recorded as an inactive tufa deposit in a spray zone with smaller actively forming tufa deposits with an area of c.50m <sup>2</sup> and the third location at Dooaghtry Flush (site ID: PS028) has been described as a large petrifying spring and flush complex with paludal tufa covering an area of c.3,000m <sup>2</sup> and is of very high conservation value (Lyons, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 14 for point locations	The habitat has been recorded at three locations, two at Dooaghtry Coast and one at Dooaghtry Flush, within Mweelrea/Sheeffry/Erriff Complex SAC by Lyons (2015). Lyons and Kelly (2016) describe eight plant communities of Irish petrifying springs based on relevé data. The Dooaghtry Flush site (PS028) falls into the <i>Palustriella falcata-Carex panicea</i> springs group (Lyons, 2015). It is not known into what groups the Dooaghtry Coast sites fall into as a full survey was not carried out at these locations. Further information on all the vegetation communities associated with this habitat is presented in Lyons and Kelly (2016)
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013). Water flow should not be altered anthropogenically. See Lyons and Kelly (2016) for further details
Water quality - nitrate level	mg/l	No increase from baseline nitrate level and less than 10mg/l	Target based on data from McGarrigle et al. (2010). See Lyons and Kelly (2016) for further details
Water quality - phosphate level	µg/l	No increase from baseline phosphate level and less than 15µg/l	Based on data from Lyons (2015). See Lyons and Kelly (2016) for further details
Vegetation composition: positive indicator species	Number per spring	At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number	Based on Lyons and Kelly (2016), where the lists of positive and high quality indicator species are presented. The positive indicator moss <i>Didymodon tophaceus</i> was found at both Dooaghtry Coast sites (PS027a, b). The high quality indicator moss <i>Catoscopium nigratum</i> (Near Threatened, Lockhart et al., 2012) was recorded at the Dooaghtry Flush site (PS028), along with the positive indicators bog pimpernel ( <i>Anagallis tenella</i> ), long-stalked yellow sedge ( <i>Carex lepidocarpa</i> ), carnation sedge ( <i>C. panicea</i> ), grass-of-parnassus ( <i>Parnassia palustris</i> ), common butterwort ( <i>Pinguicula vulgaris</i> ), brookweed ( <i>Samolus valerandi</i> ), the bryophytes <i>Aneura pinguis</i> , <i>Bryum pseudotriquetrum</i> , <i>Campylium stellatum</i> , <i>Jungermannia atrovirens</i> , <i>Palustriella falcata</i> , <i>Philonotis calcarea</i> , <i>Scorpidium cossonii</i> and <i>S. scorpioides</i> , the stonewort <i>Chara vulgaris</i> and lesser clubmoss ( <i>Selaginella selaginoides</i> ) (Lyons, 2015)

Vegetation composition: negative indicator species	Cover (DAFOR scale)	Potentially negative indicator species should not be Dominant or Abundant; invasive species should be absent	Based on Lyons and Kelly (2016), where the lists of potentially negative herbaceous, bryophyte (and alga) and woody species are presented. See Lyons and Kelly (2016) also for details on potentially invasive species, including sycamore ( <i>Acer pseudoplatanus</i> ) which is invasive in non-wooded springs and a negative indicator species in wooded springs. If two or more potentially negative bryophyte species are present, and if at least two are frequent, or at least one is abundant, then the habitat fails for this attribute. See Lyons and Kelly (2016) for further details. The potentially negative herbaceous species fool's water-cress ( <i>Apium nodiflorum</i> ) and the potentially negative woody species creeping willow ( <i>Salix repens</i> ) were recorded at Dooaghtry Flush, but neither species was Dominant or Abundant (Lyons, 2015)
Vegetation structure: sward height	Centimetres	Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm)	See Lyons and Kelly (2016) for further details
Physical structure: trampling/dung	Cover (DAFOR scale)	Cover should not be Dominant or Abundant	See Lyons and Kelly (2016) for further details

**7230 Alkaline fens**

**To restore the favourable conservation condition of Alkaline fens in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Alkaline fens habitat was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 44.8ha, covering 0.2% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 15	Roche et al. (2014) recorded alkaline fens throughout the SAC, including the slopes of the Sheeffry Hills, Ben Creggan and Ben Gorm, the Glenlaur valley, Srahrooskey, Glenkeen, Tonatleva and to the south and south-east of Corragau Lough. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Flood duration	Maintain 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.)
Ecosystem function: hydrology	Metres	Maintain 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
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly nutrient levels, 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
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Roche et al. (2014) recorded three different alkaline fen vegetation communities within this SAC. Data on the abundance of these communities is reproduced in the blanket bogs and associated habitats supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species (brown mosses)	Number of species at a representative number of 2m x 2m monitoring stops	Number of brown moss species present at each monitoring stop is at least one	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented

Vegetation composition: number of positive indicator species (vascular plants)	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush ( <i>Schoenus nigricans</i> ) flush and bottle sedge ( <i>Carex rostrata</i> ) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush ( <i>Schoenus nigricans</i> ) flush and bottle sedge ( <i>Carex rostrata</i> ) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). No non-native species were recorded within this habitat during the NSUH (Roche et al., 2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush ( <i>Juncus effusus</i> ) and common reed ( <i>Phragmites australis</i> ) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of 2m x 2m monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped rare and notable plant records for the SAC and added any new records collected during the NSUH survey. During the NSUH, the Near Threatened and FPO listed species bog orchid ( <i>Hammarbya paludosa</i> ) (Wyse Jackson et al., 2016) and the Near Threatened moss <i>Sphagnum platyphyllum</i> (Lockhart et al., 2012) were recorded within alkaline fen in the SAC by Roche et al. (2014)

**8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)**

**To restore the favourable conservation condition of Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 234.7ha, covering 0.1% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 16	Roche et al. (2014) recorded siliceous screes on several hillsides within the SAC and the habitat was particularly concentrated on the higher slopes and corries of the Sheeffry Hills, on the steeper slopes of Ben Gorm and Ben Creggan and the upper slopes and corries of the Mweelrea Mountains. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes and non-crustose lichen species at least 5%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native New Zealand willowherb ( <i>Epilobium brunnescens</i> ) was recorded within two siliceous screes monitoring stops. One monitoring stop failed due to excessive cover of the species. Pirri-pirri-bur ( <i>Acaena novae-zelandiae</i> ) was also recorded within siliceous scree habitat during the NSUH (Roche et al., 2014)
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	At least one positive indicator species present in vicinity of each monitoring stop in block scree	Attribute and target based on Perrin et al. (2014). The list of positive indicator species for this habitat is also presented in Perrin et al. (2014) and is the same as for 8220 Siliceous rocky slopes
Vegetation composition: grass species and dwarf shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of grass species and dwarf shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken ( <i>Pteridium aquilinum</i> ), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014)

Vegetation structure: grazing and browsing	Percentage of leaves/shoots grazed/browsed at a representative number of 2m x 2m monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014)
Physical structure: disturbance	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Ground disturbed by human and animal paths, scree running, vehicles less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. During the NSUH, the Near Threatened and FPO listed liverwort <i>Mastigophora woodsii</i> and the Near Threatened moss <i>Grimmia donniana</i> (Lockhart et al., 2012) were recorded within siliceous scree habitat in the SAC by Roche et al. (2014)

**8210 Calcareous rocky slopes with chasmophytic vegetation**

**To maintain the favourable conservation condition of Calcareous rocky slopes with chasmophytic vegetation in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Calcareous rocky slopes with chasmophytic vegetation was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 1.7ha, covering 0.01% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 17	Roche et al. (2014) recorded calcareous rocky slope habitat in the north-eastern corrie of the Mweelrea Mountains and on the slopes of Sheeffry Hills including the Lough Tarriff corrie, north-east of the Lough Brawn corrie, the slopes above Lugaloughaun and on the slopes north-east of the Doo Lough parking area. It is also present on the high slopes west of Drummin village. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator fern and <i>Saxifraga</i> species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and <i>Saxifraga</i> indicators at each monitoring stop is at least one	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	Number of positive indicator species at each monitoring stop is at least three	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover in local vicinity of a representative number of monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native New Zealand willowherb ( <i>Epilobium brunnescens</i> ) was recorded within the one calcareous rocky slopes monitoring stop, but its cover was not sufficiently high enough to cause the monitoring stop to fail the target (Roche et al., 2014)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken ( <i>Pteridium aquilinum</i> ), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: grazing and browsing	Percentage of leaves/shoots grazed/browsed in local vicinity of a representative number of monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014)



Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. The Vulnerable Alpine saw-wort ( <i>Saussurea alpina</i> ) (Wyse Jackson et al., 2016) has been recorded on the Sheeffry Hills in the Lough Brawn corrie (historic record) and the adjacent Lough Tarriff corrie (NSUH record), but this species cannot be attributed specifically to calcareous rocky slopes (Roche et al., 2014)
-------------------------------------	--------------------------------	--	---

---

**8220 Siliceous rocky slopes with chasmophytic vegetation**

**To restore the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Mweelrea/Sheeffry/Erriff Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2014 and Roche et al., 2014). Siliceous rocky slopes with chasmophytic vegetation was mapped in detail for the SAC and the total area of the qualifying habitat stated by Roche et al. (2014) is 164.9ha, covering 0.8% of the SAC. Roche et al. (2014) report no obvious losses of this habitat since 1995. Further information can be found in Roche et al. (2014). Further details on this and the following attributes can be found in the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for blanket bogs and associated habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 18	Roche et al. (2014) recorded siliceous rocky slope habitat on hillsides across the SAC including Laghta Eighter, the Sheeffry Hills, the Mweelrea Mountains, Ben Gorm and Ben Creggan and the Glenawough corrie. Further information can be found within Roche et al. (2014) and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	At least one positive indicator species present in vicinity of each monitoring stop	Attribute and target based on Perrin et al. (2014). The list of positive indicator species for this habitat is also presented in Perrin et al. (2014) and is the same as for 8110 Siliceous screes
Vegetation composition: non-native species	Percentage cover in local vicinity of a representative number of monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). During the NSUH, the non-native New Zealand willowherb ( <i>Epilobium brunnescens</i> ) was recorded within three siliceous scree monitoring stops, two of which failed due to excessive cover of the species. Cotoneaster ( <i>Cotoneaster</i> sp.) was also noted in this habitat during the NSUH (Roche et al., 2014)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken ( <i>Pteridium aquilinum</i> ), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: grazing and browsing	Percentage of leaves/shoots grazed/browsed in local vicinity of a representative number of monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). Roche et al. (2014) compiled and mapped rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat; however, new records should be considered within this attribute

**1013 Geyer's Whorl Snail *Vertigo geyeri***

**To maintain the favourable conservation condition of Geyer's Whorl Snail in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. There is one known site for this species in the SAC within five 1km grid squares - L7369, L7468, L7469, L7568 and L7569. See map 19	Geyer's whorl snail ( <i>Vertigo geyeri</i> ) in Mweelrea/Sheeffry/Erriff Complex SAC is found in wetland habitat at Dooaghtry (Holyoak, 2005; Moorkens, 2004; Moorkens and Killeen, 2011). This locality should be considered as a single site (site code VgCAM5 in Moorkens and Killeen (2011)). There have been records from five 1km grid squares within the site and within the SAC boundary (L7369, L7468, L7469, L7568 and L7569)
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	Number of positive samples at least stable, subject to natural processes	Attribute and target based on Moorkens and Killeen (2011). Positive samples mean the confirmed presence of snails (living or recently dead adults and/or juveniles)
Habitat quality: soil wetness	Metres along monitoring transect	No decline, subject to natural processes	Attribute and target based on Moorkens and Killeen (2011)
Habitat area	Hectares	Stable or increasing subject to natural processes. No less than 30ha of at least sub-optimal habitat	Suitable conditions for the species can be found throughout the site. Moorkens and Killeen (2011) give a target figure of 30ha to be at least in sub-optimal condition. Optimal habitat is defined as flushed fen grassland with sedge/moss lawns 5-30cm tall, containing a high diversity, with species such as <i>Carex lepidocarpa</i> , <i>Parnassia palustris</i> , <i>Pinguicula vulgaris</i> , <i>Juncus articulatus</i> , <i>Eriophorum</i> sp. and the mosses <i>Scorpidium revolvens</i> and <i>Campylium stellatum</i> , with scattered tussocks of <i>Schoenus nigricans</i> ≤80cm tall. During sampling, the water table should be between 0-5cm of the soil surface, but not above ground level. Sub-optimal habitat is defined as above, but more dominated by <i>Schoenus nigricans</i> tussocks with mosses between the tussocks, or overall sward height is more than 30cm, or the water table is below 5cm, or the ground is flooded at the time of sampling

**1014 Narrow-mouthed Whorl Snail *Vertigo angustior***

**To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. There is one known site for this species in the SAC, within three 1km squares - L7567, L7568, L7470. See map 19	Narrow-mouthed whorl snail ( <i>Vertigo angustior</i> ) in Mweelrea/Sheeffry/Erriff Complex SAC is found on the coastal dunes and machair at Dooaghtry (Holyoak, 2005; Moorkens, 2007; Moorkens and Killeen, 2011, where the site code is VaCAM3). This locality, which has been known for over 100 years, should be considered as a single site. There have been records from three 1km grid squares within the site and within the SAC boundary (L7567, L7568, L7470). There has been just a single record from L7567 in 1991, but the species has been recorded from L7568 and L7470 on more than one occasion and since 2000
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	Number of positive samples at least stable, subject to natural processes	Attribute and target based on Moorkens and Killeen (2011). Positive samples mean the confirmed presence of snails (living or recently dead adults and/or juveniles). Optimal and sub-optimal habitats are defined below
Habitat quality: optimal soil wetness	Metres along monitoring transect	No decline, subject to natural processes	Attribute and target based on Moorkens and Killeen (2011)
Habitat extent	Hectares	Stable or increasing, subject to natural processes. No less than 0.23ha of optimal habitat and 0.44ha of sub-optimal habitat	Suitable conditions for the species can be found throughout the site, but the exact locations have clearly changed historically (Tattersfield, 1993; Moorkens, 2007). Moorkens and Killeen (2011) give a figure of 0.23ha of optimal habitat and 0.41ha of sub-optimal habitat. These should be viewed as minimum figures to maintain the population. Optimal habitat is defined as maritime grassland with red fescue ( <i>Festuca rubra</i> ) and silverweed ( <i>Potentilla anserina</i> ), 10-25cm in height OR damp grassland dominated by yellow flag ( <i>Iris pseudacorus</i> ), silverweed and other grasses up to 0.9m high. Soil is damp and friable soil, covered with a layer of humid, open structured thatch and area is lightly grazed by cattle. Sub-optimal habitat is defined as above, but with vegetation height less than 5cm or greater than 15cm, or the yellow flag grassland greater than 0.9m high, or the water table is below 5cm, or the ground is flooded at the time of sampling

**1029 Freshwater Pearl Mussel *Margaritifera margaritifera***

**To restore the favourable conservation condition of Freshwater Pearl Mussel in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain distribution at 4.34km. Note that the distribution target length includes the perimeter of Fin Lough. See map 20	The conservation objective applies to the Bundorragha freshwater pearl mussel population in Mweelrea/Sheeffry/Erriff Complex SAC, which is of international importance and one of eight Irish populations prioritised for conservation action (Moorkens, 2010; NPWS, 2010). The main distribution and abundance of the freshwater pearl mussel in the Bundorragha catchment was mapped by Moorkens (2005) from downstream of the confluence of the Owennaglogh (just upstream of Delphi Bridge) to the river mouth at Killary Harbour. In 2014, a small number of mussels was found in Fin Lough, near the mouth of the Owengarr River (Roden and Murphy, 2014). Moorkens (2017) found mussels from the cottage near Doo Lough to Fin Lough in the Owengarr River. The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Bundorragha system. See NPWS (2010) for further information
Population size	Number of adult mussels	Restore populations to at least 2 million adult mussels	The Bundorragha population was estimated as 2,000,000 (NPWS, 2010). Mussels are categorised as abundant along much of the Bundorragha, densities exceed 250/m <sup>2</sup> throughout the lower sections and are up to 500 mussels/m <sup>2</sup> in places (Moorkens, 2005, 2012, 2017). Mussel density is low in the Owengarr River (Moorkens, 2017). Moorkens (2012) recorded a net decrease of 2.6% in adults between 2005-2012. NPWS (2013) assumed that all priority populations had declined at a rate of 1% per year 2007-2012. A mussel kill and associated decline in adult and juvenile mussels was recorded in 2014 (Moorkens, 2014). In 2016, recruitment was excellent and the conservation condition favourable (Moorkens, 2017); however, a further kill was recorded in 2017, demonstrating that the Bundorragha is close to sustainable, but is subject to on-going significant pressures. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Bundorragha system
Population structure: recruitment	Percentage per size class	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	Mussels of no more than 65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels of no more than 30mm are 'juvenile mussels' and are always buried in the substratum. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Sub-basin Management Plan (NPWS, 2010) summarises the demographic work up to 2010 (Ross, 1984; Moorkens, 2005, 2009). The Bundorragha had recovered to favourable condition in 2009, with 21.1% of mussels ≤65mm and 7.5% ≤30mm (Moorkens, 2009; NPWS, 2010). It returned to unfavourable condition in 2012 (6% ≤65mm, 0.4% ≤30mm) and 2014 (12.7% ≤65mm, 3.3% ≤30mm) (Moorkens, 2012, 2014). It was favourable again in 2016 (43.5% ≤65mm, 23.2% ≤30mm) (Moorkens, 2017). The Bundorragha population is almost sustainable. The target is for sufficient juvenile recruitment to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system

Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses. The Bundorragha passed both targets in 2009 (Moorkens, 2009; NPWS, 2010). It failed the targets in 2012 (2.55% decline in live adults and 2.91% dead shells) and again in 2014, when a significant kill was recorded, and passed in 2016 (Moorkens, 2012, 2014, 2017). The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Suitable habitat: extent	Kilometres	Maintain suitable habitat extent in 2.67km of the Bundorragha (see map 20) and any additional stretches necessary for salmonid spawning. Note that the suitable habitat target length includes the perimeter of Fin Lough	The extent of the mussel habitat in the Bundorragha has been well-documented; from the early surveys of Ross (1984, 1988) and Moorkens (1995, 1996) to full baseline monitoring in 2005 (Moorkens, 2005), and survey upstream of Fin Lough in 2016 (Moorkens, 2017). Much of the Owengarr river is unsuitable owing to unstable substratum, and mussel numbers are small. Most of the available habitat in the Bundorragha system is occupied by mussels (Moorkens, 2005, 2009, 2012, 2014). Despite the Bundorragha habitat's recovery to favourable condition in 2009 (NPWS, 2010), it returned to unfavourable condition (Moorkens, 2012, 2014). It reached favourable again in 2016, but flow/drought, sedimentation and nutrient impacts are on-going concerns. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The habitat is a combination of the area of 1) habitat adult and juvenile mussels can occupy; 2) spawning and nursery habitats host fish can occupy. Fish nursery habitat typically overlaps with mussel habitat. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only spawning areas that can regularly contribute juvenile fish to areas occupied by adult mussels should be considered. Availability of mussel and fish habitat is determined by flow and substratum conditions. It is highly sensitive to hydromorphological changes, sedimentation and nutrient enrichment. Pressures throughout the catchment (map 20) contribute to such impacts. The habitat in the Bundorragha periodically cannot support sufficient juvenile and adult survival (Moorkens, 2012, 2014). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality - macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	The EQR targets correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). In 2009, the habitat in the Bundorragha system passed both targets (Williams, 2009; NPWS, 2010). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system

Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Restore substratum quality - filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	The Bundorragha passed both targets in 2009 (borderline pass/fail for macrophytes) (Moorkens, 2009; NPWS, 2010). It failed the macrophyte target in 2012 and <i>Myriophyllum</i> cover reached 80% in parts of the mussel habitat surveyed (Moorkens, 2012). In 2014, it failed both targets, with 75% macrophyte cover in places, and a general increase in filamentous algae reaching cover abundance of up to 90% (Moorkens, 2014). Filamentous algae were present in 2016, but at trace levels, and <i>Myriophyllum</i> was common, but less abundant than in previous surveys (Moorkens, 2017). Sufficient recruitment of juvenile mussels is being prevented by the poor condition of the river substratum. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Substratum quality: sediment	Occurrence	Restore substratum quality - stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The Bundorragha passed this target in 2009 (Moorkens, 2009; NPWS, 2010). In 2012, sand cover had increased and although heavy in places, it passed the target (Moorkens, 2012). In 2014, sand cover was 'deep and heavy in places': a borderline pass/fail (Moorkens, 2014). Sand was not recorded in 2016 and silt plumes were restricted to margins and other areas of slower flow (Moorkens, 2017). Sand deposition may be acting in combination with bank erosion, flow changes and nutrients to make the habitat unfavourable for mussels. The impacts include increased frequency of drought and emersion of mussels, and increased macrophyte cover (Moorkens, 2014), and temporary declines in oxygen in the substratum may also occur. Sufficient survival of juvenile and adult mussels is being prevented by periodic poor substratum condition. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. The Bundorragha passed the redox target in 2009, 2012, 2014 and 2016, with average declines of 16%, 18.8%, 14.7% and 9.1% respectively (Moorkens, 2009, 2012, 2014, 2017; NPWS, 2010). As noted above, however, the habitat is periodically impacted, sand deposition is a problem and declines in oxygen in the substratum may be occurring under certain conditions (e.g. at low flows, or when organic material is decaying). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system

Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regime	The availability of suitable habitat is largely determined by flow (catchment geology is the other important factor). In order to restore the species' habitat, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum; 2) high flows are not artificially increased so as to cause excessive scour of mussel habitat; 3) low flows do not exacerbate the deposition of fine sediments or growth of algae/macrophytes and 4) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle; see Moorkens and Killeen (2014). Groundwater inflow to the substratum also contributes to water-cycling and favourable habitat condition. The flow in the Bundorragha has been significantly impacted (Moorkens, 2014). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval stage of the freshwater pearl mussel and, thus, are essential to completion of the life cycle. 0+ and 1+ fish are typically used, both because of habitat overlaps and the development of immunity with age in fish. Fish presence is sufficient as higher fish density and biomass is indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for mussels and a lack of mussel recruitment, while significantly lower host fish density and biomass were associated with high juvenile mussel numbers. Fish movement patterns must be such that 0+ fish remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. In 2009, glochidia were found on salmon, but not trout, in the Bundorragha (Johnston, 2009; NPWS, 2010)
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the population	Riparian habitats, including those along lake fringes, particularly natural/semi-natural woodlands and wetlands, even where they do not form part of a natural floodplain, are a vital part of the structure and functioning of river systems. Fringing habitats aid in the settlement of fine suspended matter, protect banks from erosion, contribute to nutrient cycling and the aquatic food web (e.g. allochthonous matter) and provide habitat for certain life-stages of fish, birds and invertebrates. Shade may also be important in suppressing algal and macrophyte growth in enriched rivers and moderating temperatures. Fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. Riverbank erosion is impacting on mussels in the Bundorragha. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Bundorragha system



## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 1106 Salmon *Salmo salar*

**To restore the favourable conservation condition of Atlantic Salmon in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmon's upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Carrownisky River is currently below CL, meeting 55% of CL. The other river systems overlapping the SAC, namely the Bundorragha, Erriff and Bunowen systems, are currently reaching CL targets
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice ( <i>Lepeophtheirus salmonis</i> )
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 1355 Otter *Lutra lutra*

**To maintain the favourable conservation condition of Otter in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 826.0ha along river banks/lake shoreline/around ponds and 26.3ha above high water mark (HWM)	No field survey. Areas mapped to include 10m terrestrial buffer, identified as critical for otters (NPWS, 2007), along shoreline (above HWM) and along rivers and around water bodies
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 118.0ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (Kruuk, 2006; NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 397.9km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 244.2ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991; Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 21	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

**1395**                      **Petalwort *Petalophyllum ralfsii***

**To maintain the favourable conservation condition of Petalwort in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

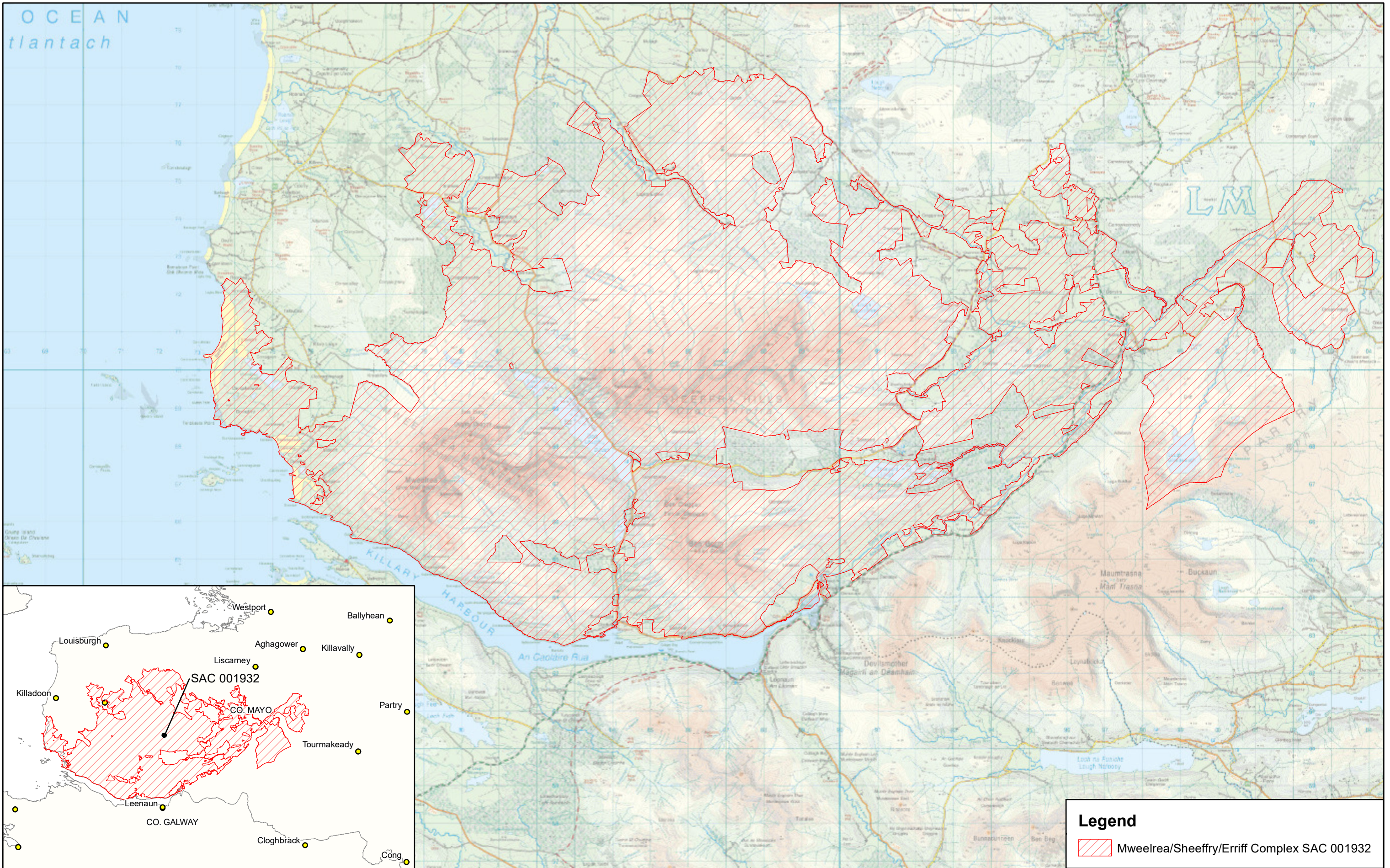
Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No decline, subject to natural processes. See map 22 for recorded locations	The known population of petalwort ( <i>Petalophyllum ralfsii</i> ) in Mweelrea/Sheeffry/Erriff Complex SAC is at Dooaghtry, where it occurs on tightly sheep-grazed turf on flat machair plain, on the sides of low sandy hummocks and in flushed machair. Data from NPWS surveys and Campbell (2013). See also Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The area of occupancy of petalwort ( <i>Petalophyllum ralfsii</i> ) at Dooaghtry, estimated from polygons drawn around GPS co-ordinates taken from NPWS surveys and Campbell (2013), is c.159,648m <sup>2</sup> . However, only c.60% of this area is suitable for petalwort, i.e. c.95,790m <sup>2</sup> (9.58ha). See also Campbell et al. (2015)
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but is not subject to prolonged inundation by flooding in winter	Petalwort ( <i>Petalophyllum ralfsii</i> ) grows on damp sandy substrate. Based on Campbell (2013) and Campbell et al. (2015)
Hydrological conditions: water table level	Centimetres in a representative number of 1m x 1m monitoring plots	Mean groundwater level should not be more than 80cm from ground surface	See Campbell et al. (2015) for further details
Physical structure: bare soil	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage cover of bare soil should be more than 5%	At Dooaghtry, petalwort ( <i>Petalophyllum ralfsii</i> ) grows in compacted, sandy ground. Campbell (2013) recorded bryophyte cover of 34-90% in four plots at Dooaghtry. See Campbell et al. (2015) for further details
Vegetation structure: vegetation height	Centimetres in a representative number of 1m x 1m monitoring plots	Mean vegetation height should be less than 6cm	At Dooaghtry, petalwort ( <i>Petalophyllum ralfsii</i> ) habitat is maintained by rabbit ( <i>Oryctolagus cuniculus</i> ) and sheep grazing and some trampling (by walkers and sheep). Campbell (2013) recorded a mean height of vegetation of 3.4cm in four plots at Dooaghtry. See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage shrub cover should be less than 25%	See Campbell et al. (2015) for further details

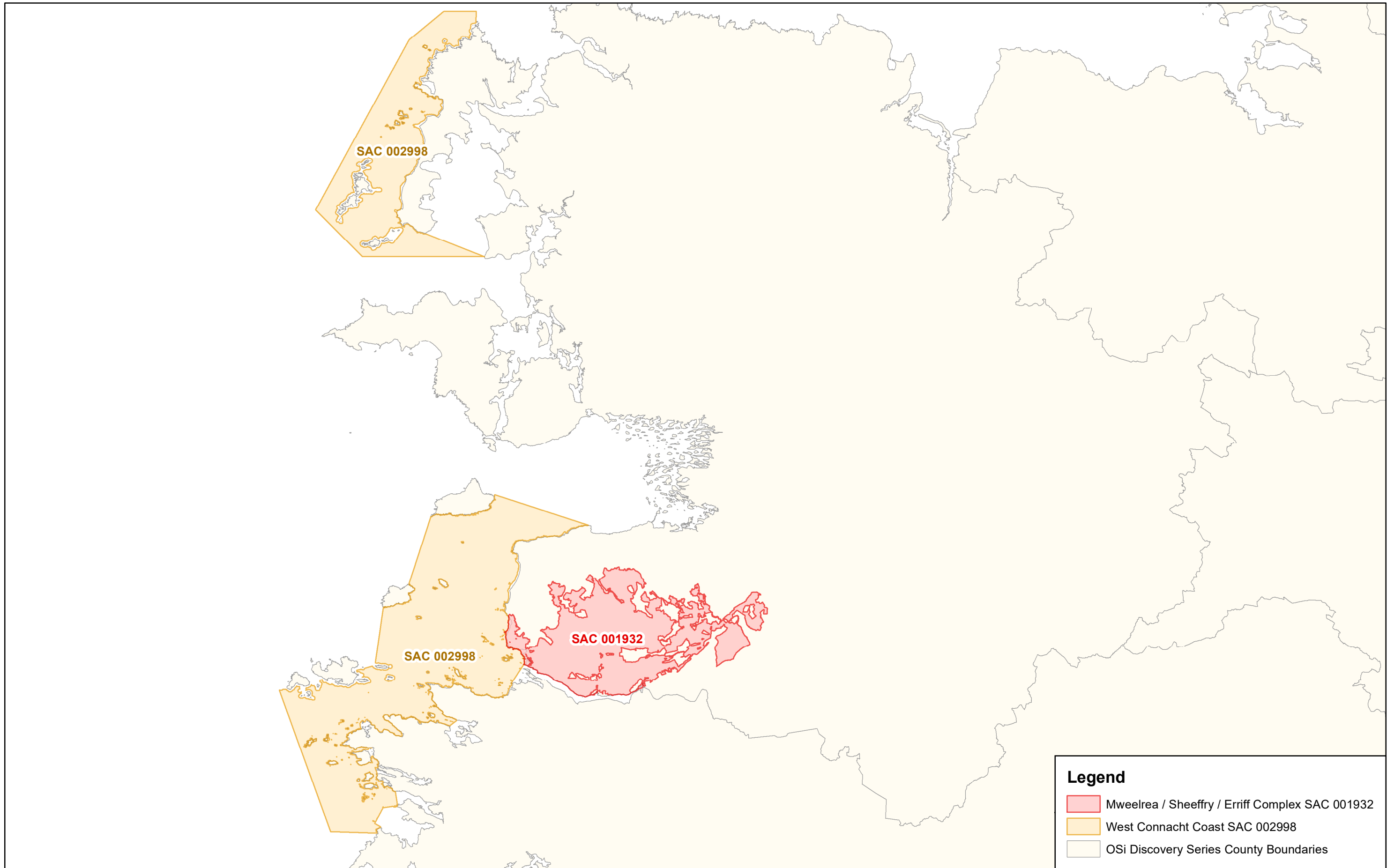
## Conservation Objectives for : Mweelrea/Sheeffry/Erriff Complex SAC [001932]

### 1833 Slender Naiad *Najas flexilis*

**To maintain the favourable conservation condition of Slender Naiad in Mweelrea/Sheeffry/Erriff Complex SAC, which is defined by the following list of attributes and targets:**

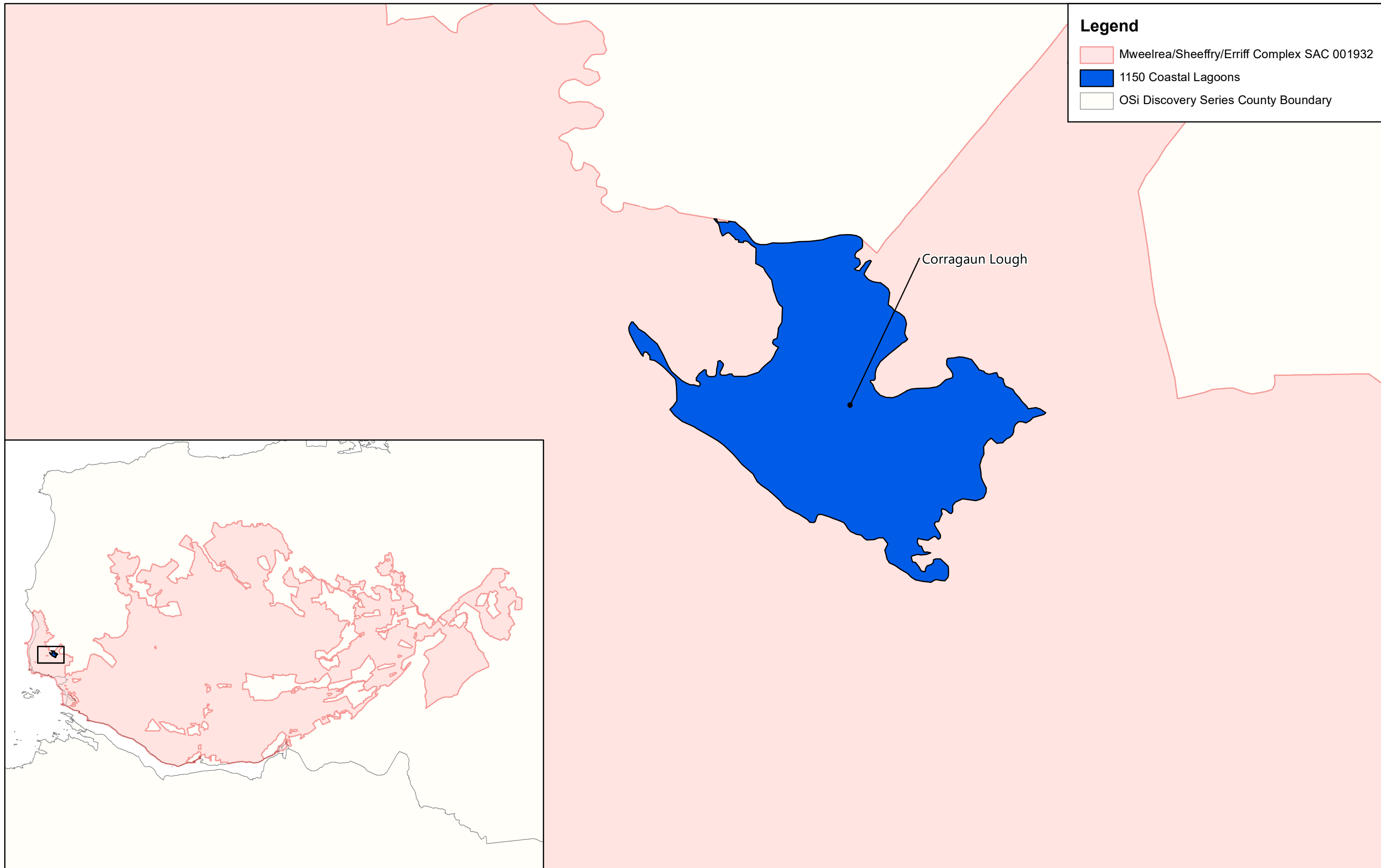
Attribute	Measure	Target	Notes
Population extent	Hectares; distribution	No change to the spatial extent of <i>Najas flexilis</i> within Lough Nahaltora, subject to natural processes. See map 23 for known location	A population of <i>Najas flexilis</i> (slender naiad) occurs in Lough Nahaltora in Mweelrea/Sheeffry/Erriff Complex SAC. A record for <i>Najas flexilis</i> in Fin Lough has been rejected (Roden and Murphy, 2014). It is nevertheless possible that the species is more widespread within the SAC. See the Mweelrea/Sheeffry/Erriff Complex SAC conservation objectives supporting document for <i>Najas flexilis</i> for further details
Population depth	Metres	No change to the depth range of <i>Najas flexilis</i> within Lough Nahaltora, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Population abundance	Square metres	No change to the cover abundance of <i>Najas flexilis</i> , subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Habitat extent	Hectares	No decline, subject to natural processes	See the <i>Najas flexilis</i> 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 the <i>Najas flexilis</i> supporting document for further details
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the population of the species	See the <i>Najas flexilis</i> supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the population of the species	See the <i>Najas flexilis</i> supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of <i>Najas flexilis</i> , subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Water colour	mg/l PtCo	Maintain/restore appropriate water colour to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details
Associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details





**Legend**

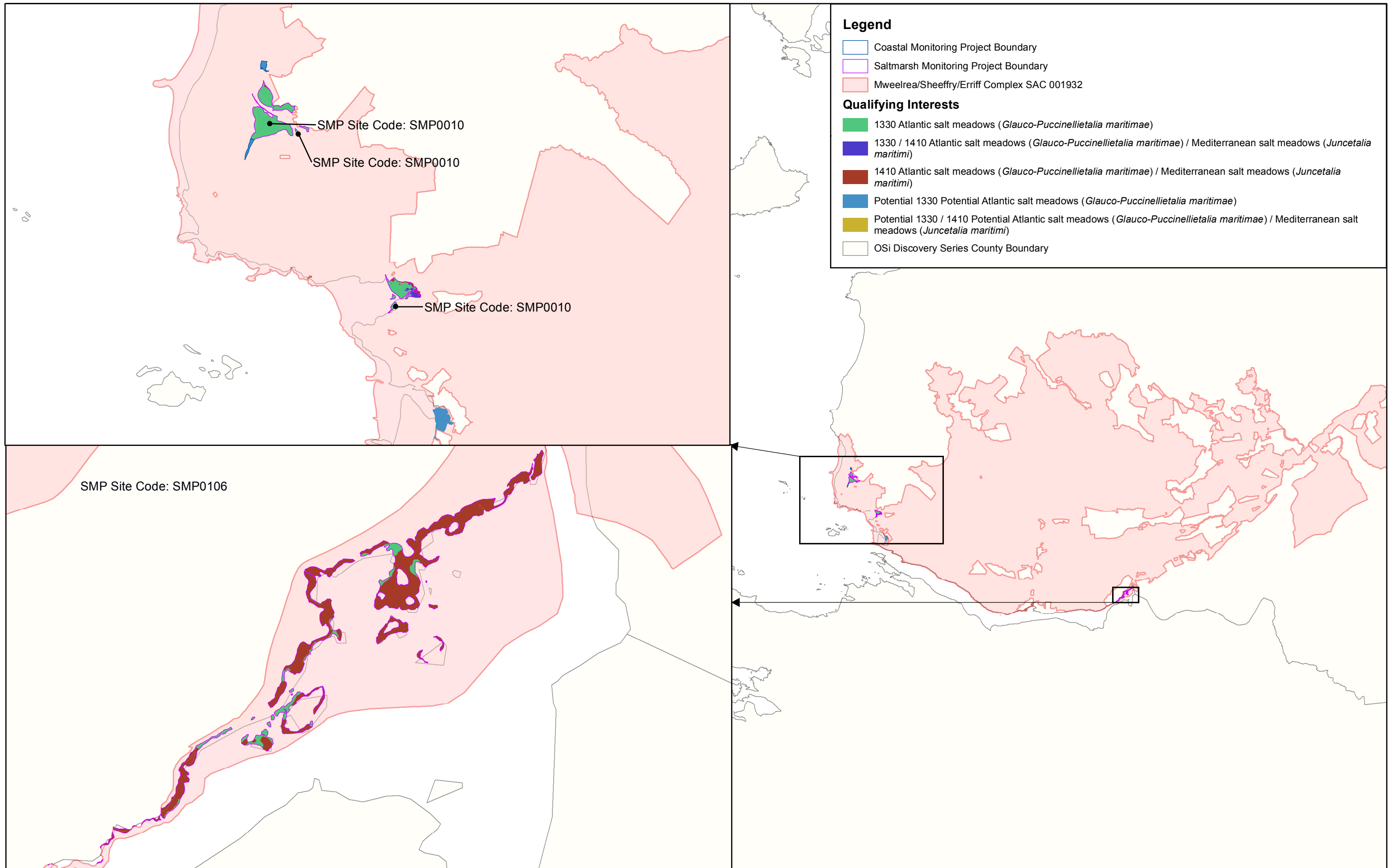
- Mweelrea / Sheeffry / Erriff Complex SAC 001932
- West Connacht Coast SAC 002998
- OSi Discovery Series County Boundaries



**Legend**


- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- 1150 Coastal Lagoons
- OSi Discovery Series County Boundary


Corragoun Lough







**Legend**


 Mweelrea/Sheeffry/Erriff Complex SAC 001932


 Sand Dune Monitoring Project Boundary

**Qualifying Interests**


 1210 Annual vegetation of drift lines


 2110 Embryonic shifting dunes

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

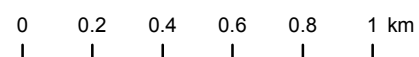
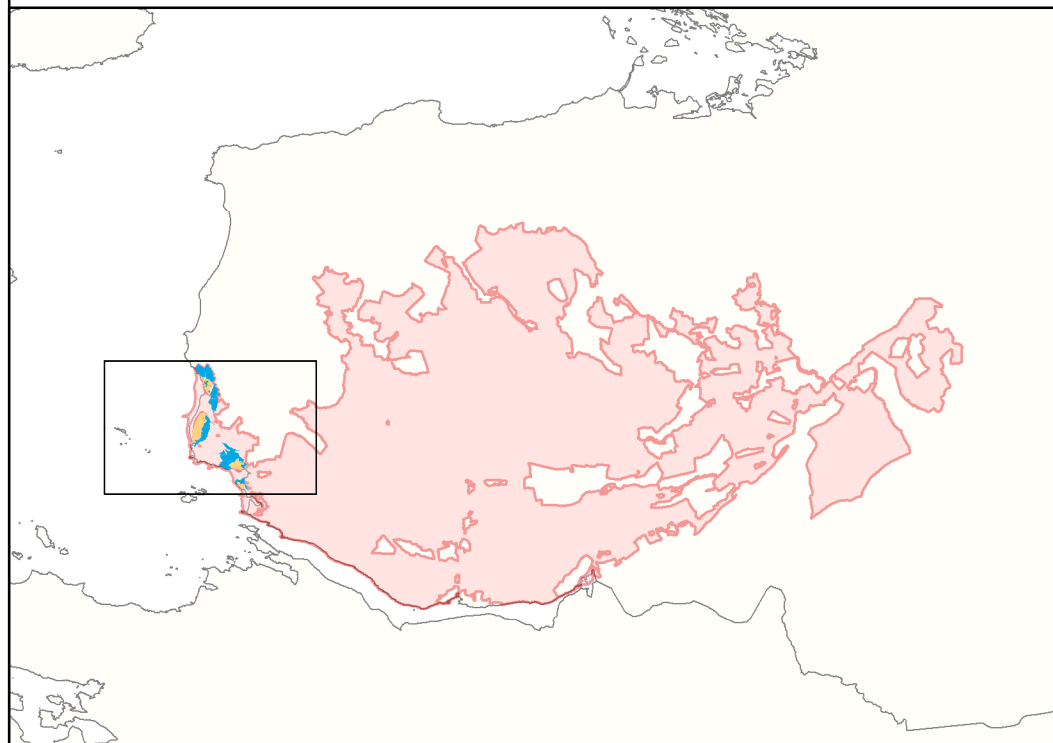
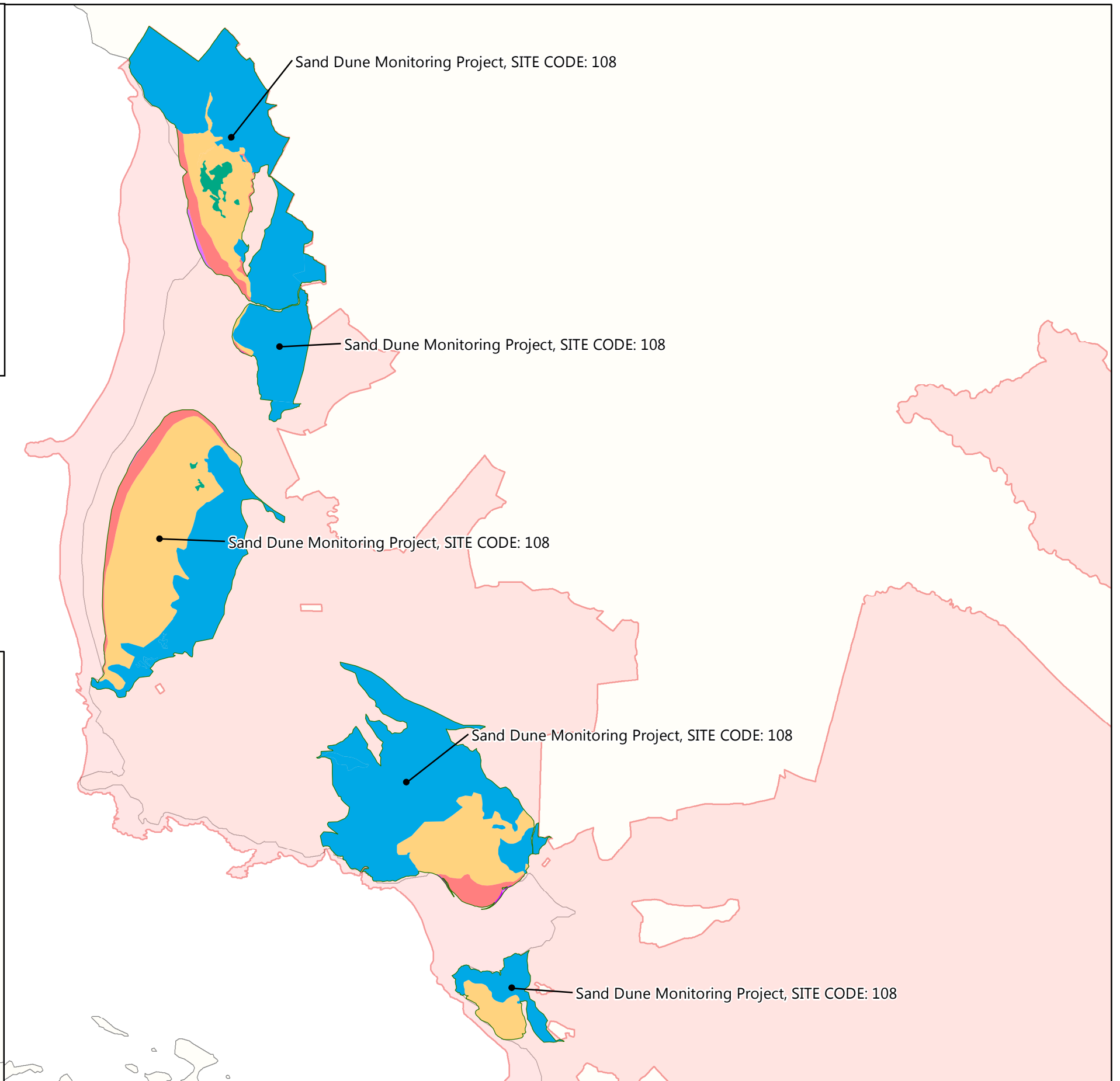
 21A0 Machairs (\* in Ireland)

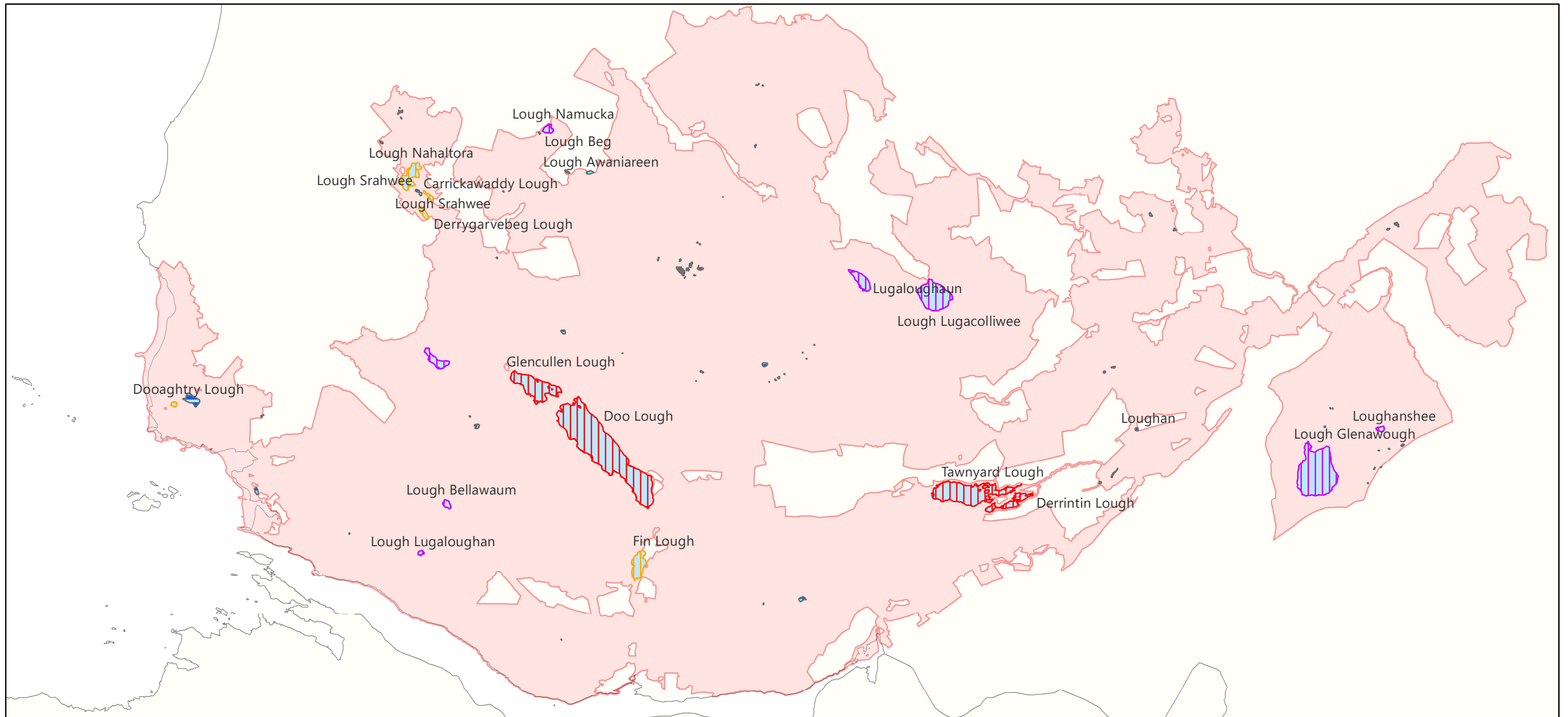
**Non Qualifying Interests**

 2130 Fixed dunes with herbaceous vegetation ("grey dunes")

 2190 Humid dune slacks

 OSi Discovery Series County Boundary





**Legend**

Mweelrea/Sheeffry/Erriff Complex SAC 001932

OSi Discovery Series County Boundary

**Indicative Lake Habitats**

3110 Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflorae*

3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*

3160 Natural dystrophic lakes and ponds

3110 / 3160 Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflorae* / Natural dystrophic lakes and ponds

3110 / 3130 Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflorae* / Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*

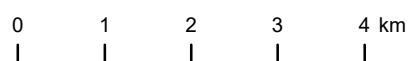


An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 6:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
INDICATIVE LAKE HABITATS**

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**




The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas









**Map Version 1  
Date: Aug 2017**

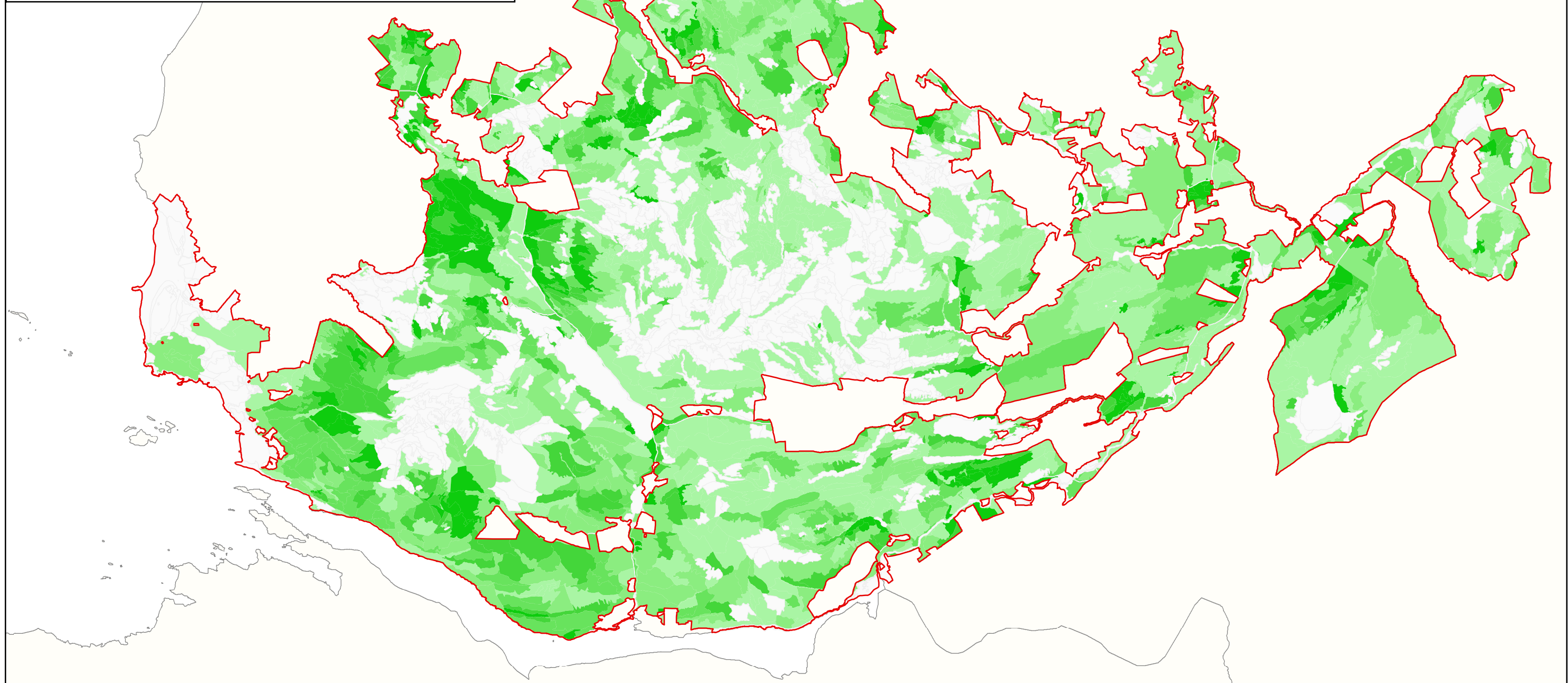
**Legend**

 Mweelrea/Sheeffry/Erriff Complex SAC 001932

 OSi Discovery Series County Boundary

**Cover of 4010 Northern Atlantic wet heaths with *Erica tetralix***

-  0%
-  0.1% - 20%
-  20.1% - 40%
-  40.1% - 60%
-  60.1% - 80%
-  80.1% - 100%

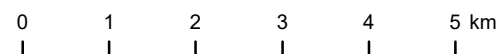


An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 7:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
WET HEATH**

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**



The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland  
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas



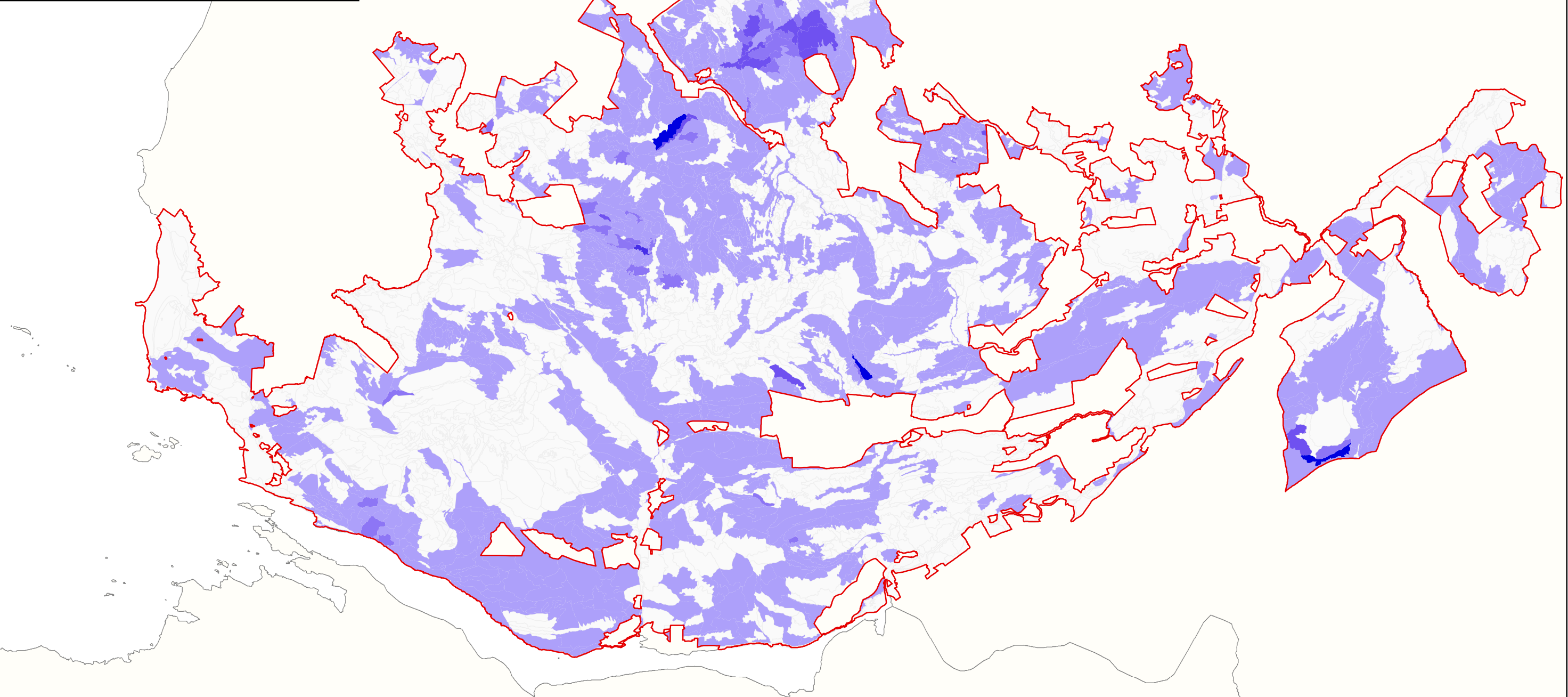
**Map Version 1  
Date: Aug 2017**

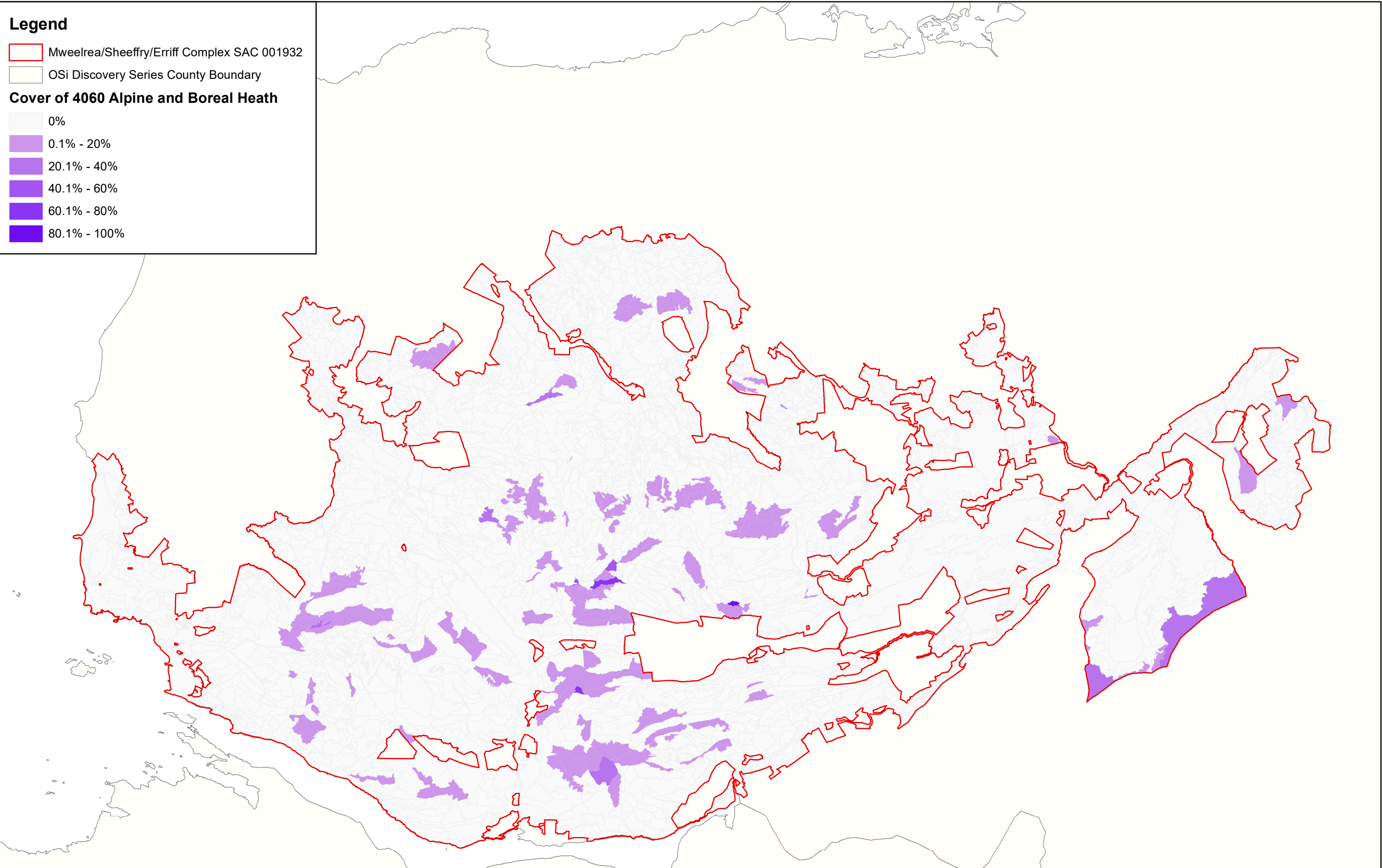
**Legend**

- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary

**Cover of 4030 European dry heaths**

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%



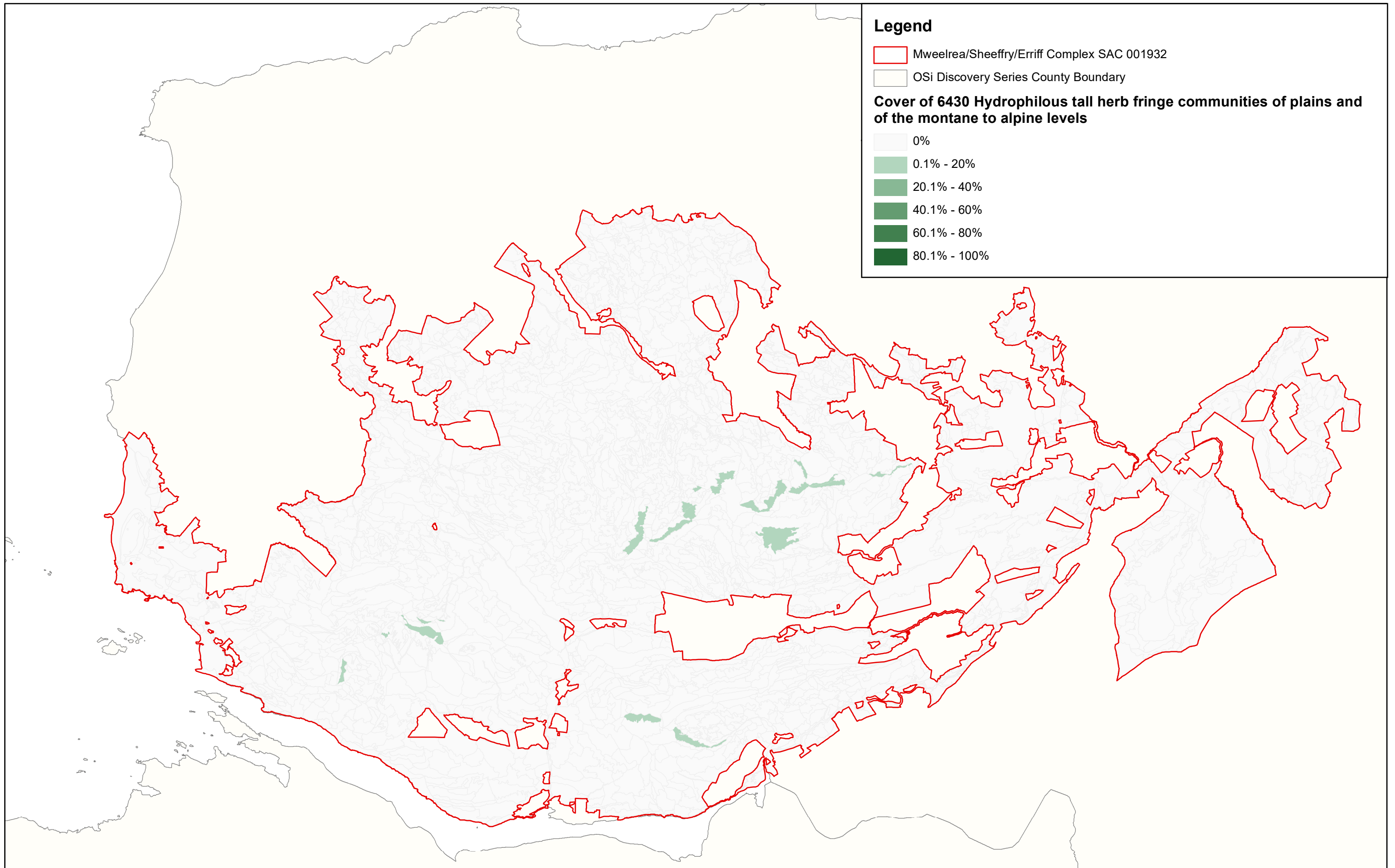


**Legend**

- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary

**Cover of 4060 Alpine and Boreal Heath**

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%



**Legend**

Mweelrea/Sheeffry/Erriff Complex SAC 001932

OSi Discovery Series County Boundary

**Cover of 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels**

0%

0.1% - 20%

20.1% - 40%

40.1% - 60%

60.1% - 80%

80.1% - 100%



An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 10:**  
**MWEELREA/SHEEFFRY/ERRIFF SAC**  
**CONSERVATION OBJECTIVES**  
**HYDROPHILOUS TALL HERB GRASSLAND**

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

**SITE CODE:**  
**SAC 001932; version 3.01**  
**CO. MAYO**




The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Nil sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas









**Map Version 1**  
**Date: Aug 2017**

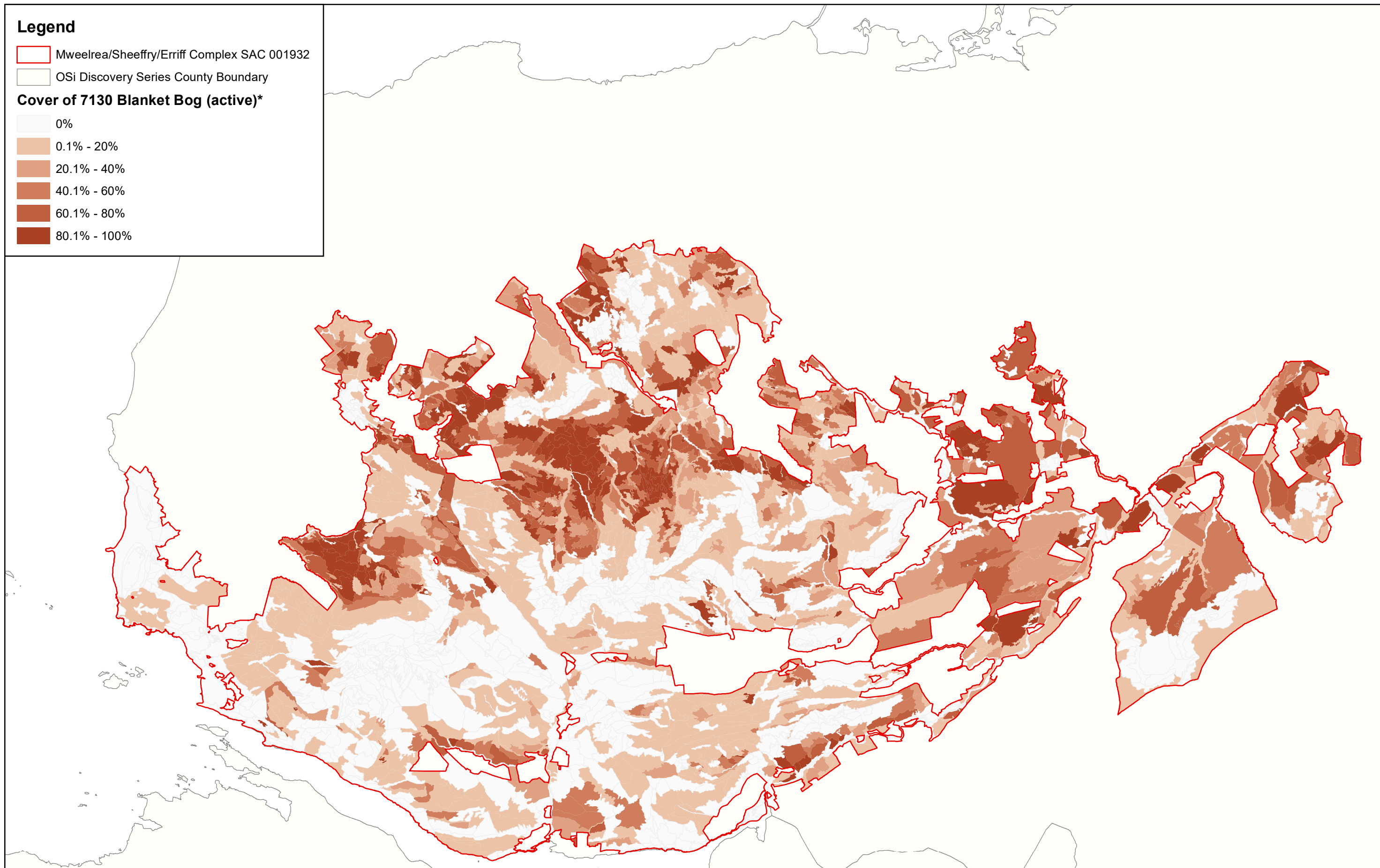
**Legend**

 Mweelrea/Sheeffry/Erriff Complex SAC 001932

 OSi Discovery Series County Boundary

**Cover of 7130 Blanket Bog (active)\***

-  0%
-  0.1% - 20%
-  20.1% - 40%
-  40.1% - 60%
-  60.1% - 80%
-  80.1% - 100%

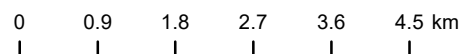


An Roinn  
Cultúir, Oidhreachta agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 11:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
BLANKET BOG\***

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**

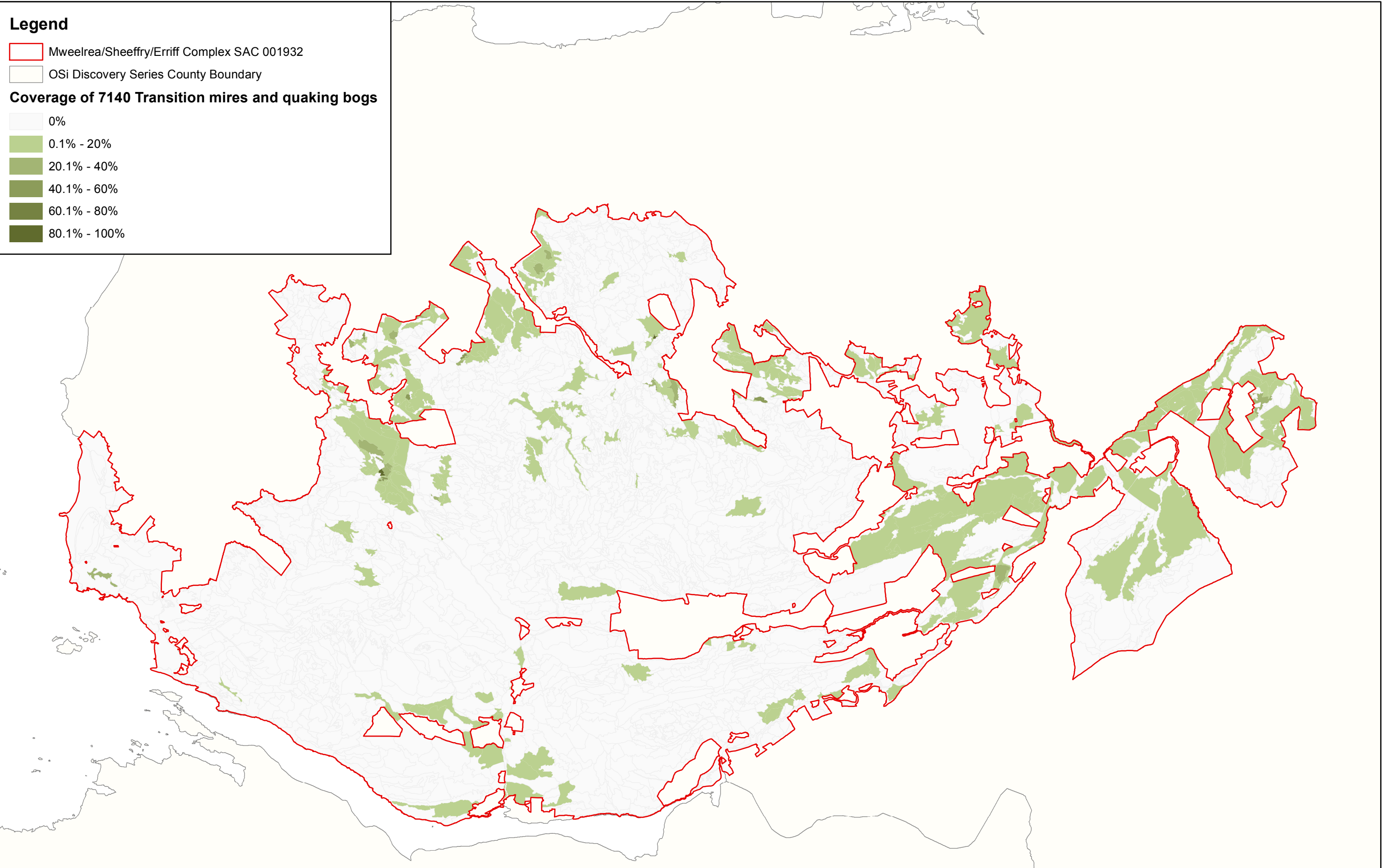


The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas



**Map Version 1  
Date: Aug 2017**



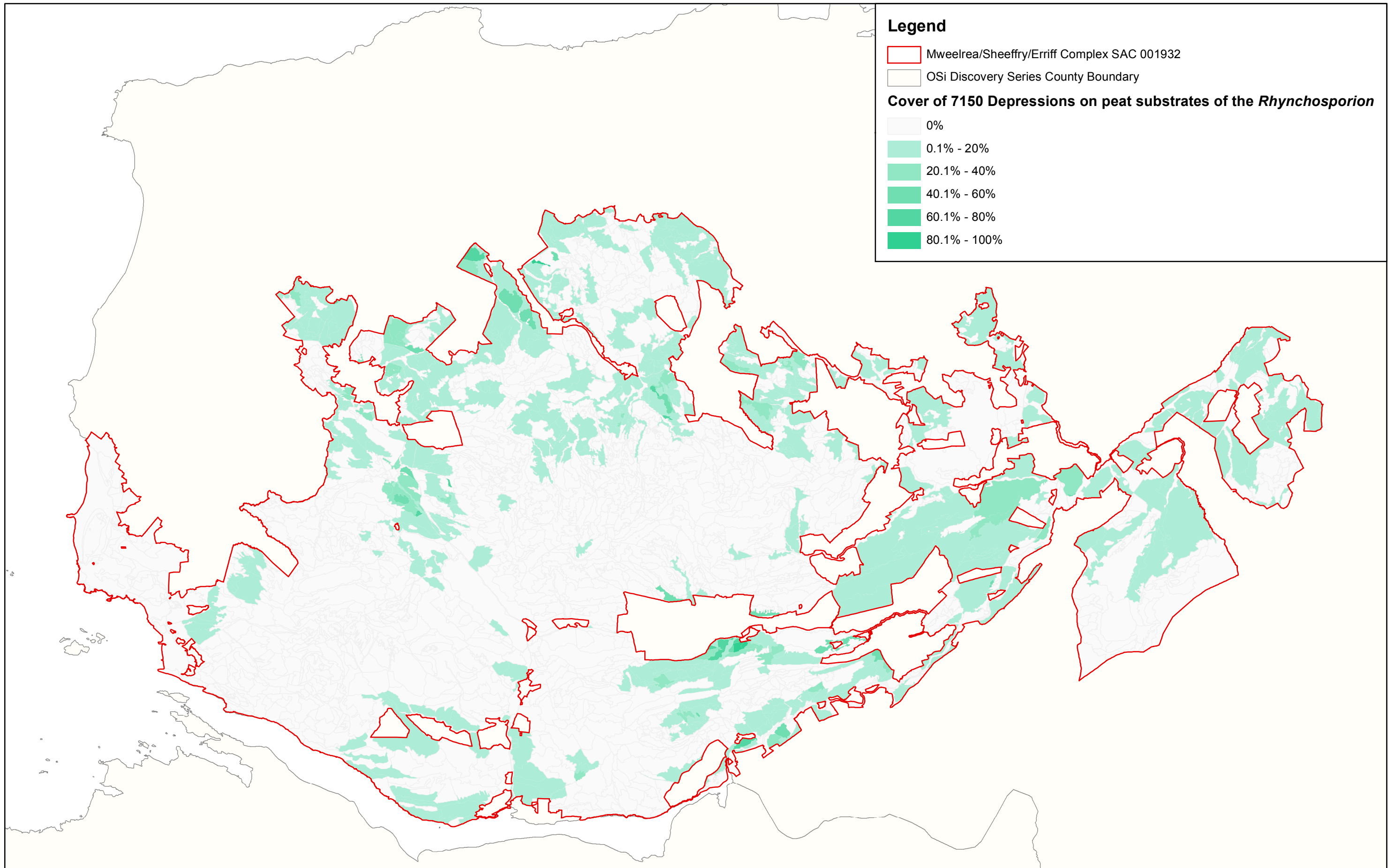
**Legend**

- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary

**Coverage of 7140 Transition mires and quaking bogs**

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%





An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 13:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
DEPRESSIONS ON PEAT SUBSTRATES**

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**



The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

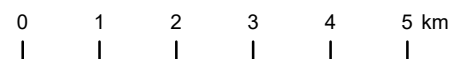
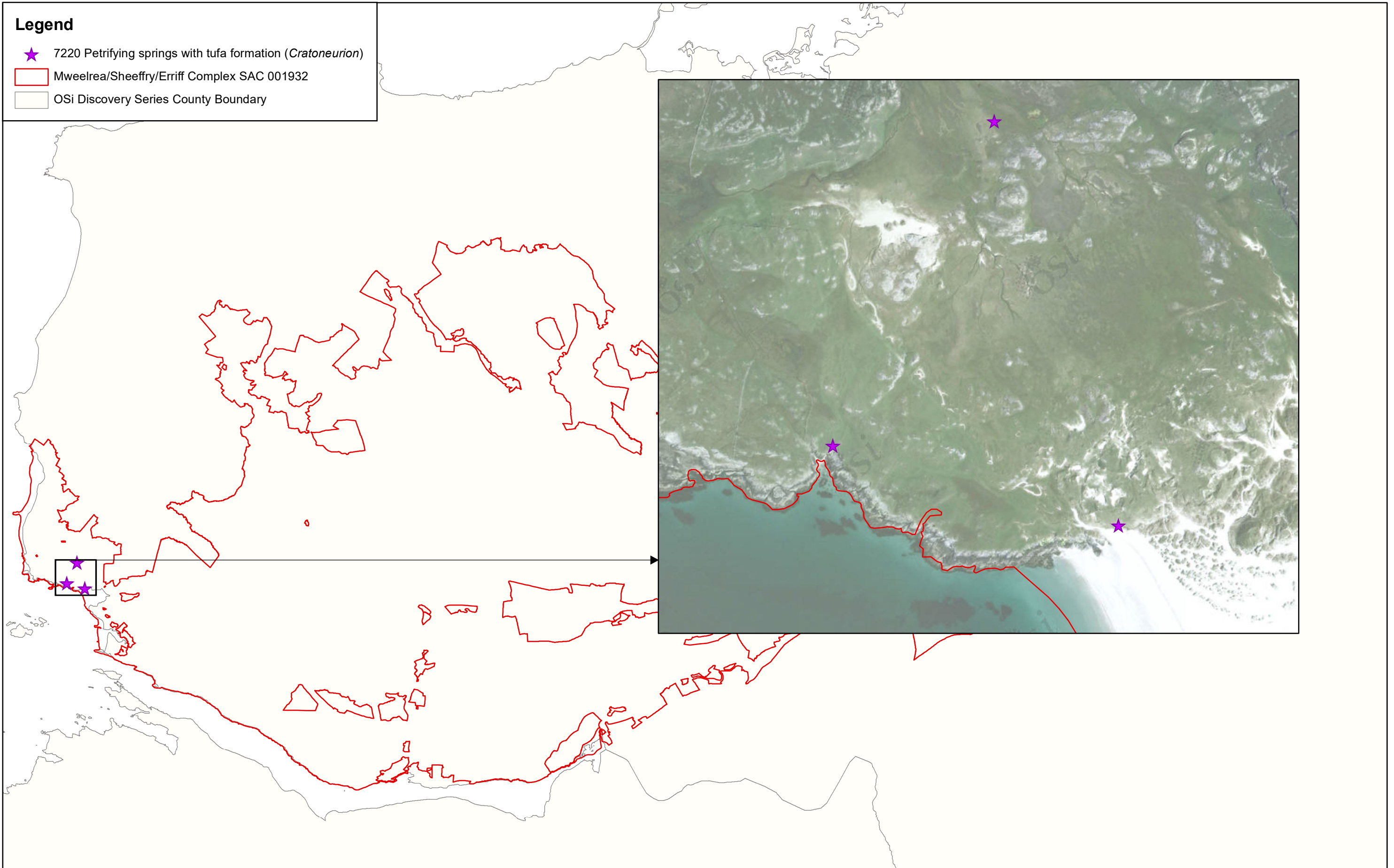
N

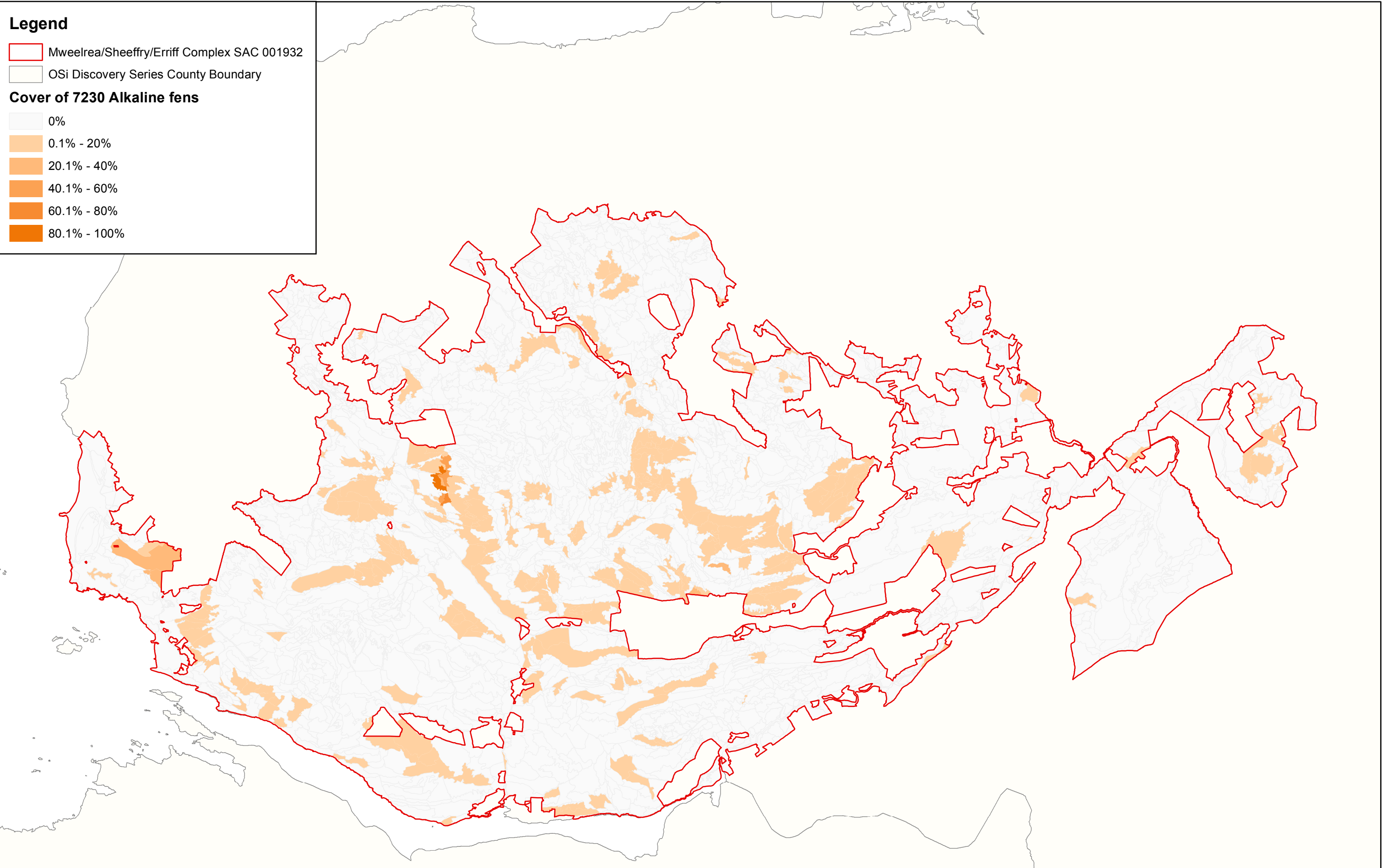


**Map Version 1  
Date: Aug 2017**

**Legend**

- ★ 7220 Petrifying springs with tufa formation (*Cratoneurion*)
- ▭ Mweelrea/Sheeffry/Erriff Complex SAC 001932
- ▭ OSi Discovery Series County Boundary





**Legend**

- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary

**Cover of 7230 Alkaline fens**







- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

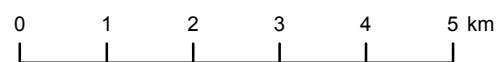
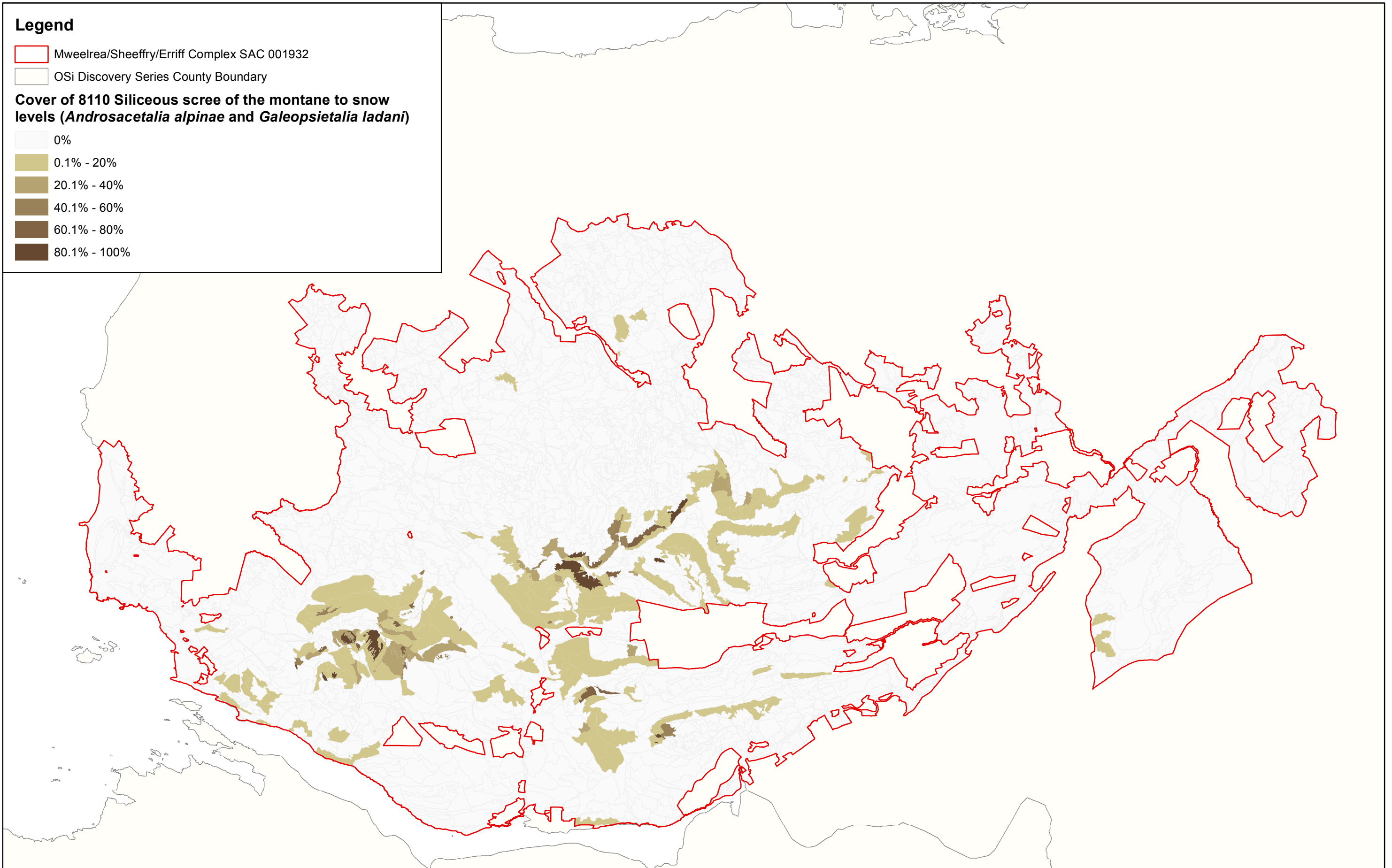
**Legend**

 Mweelrea/Sheeffry/Erriff Complex SAC 001932


 OSi Discovery Series County Boundary

**Cover of 8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)**

-  0%
-  0.1% - 20%
-  20.1% - 40%
-  40.1% - 60%
-  60.1% - 80%
-  80.1% - 100%









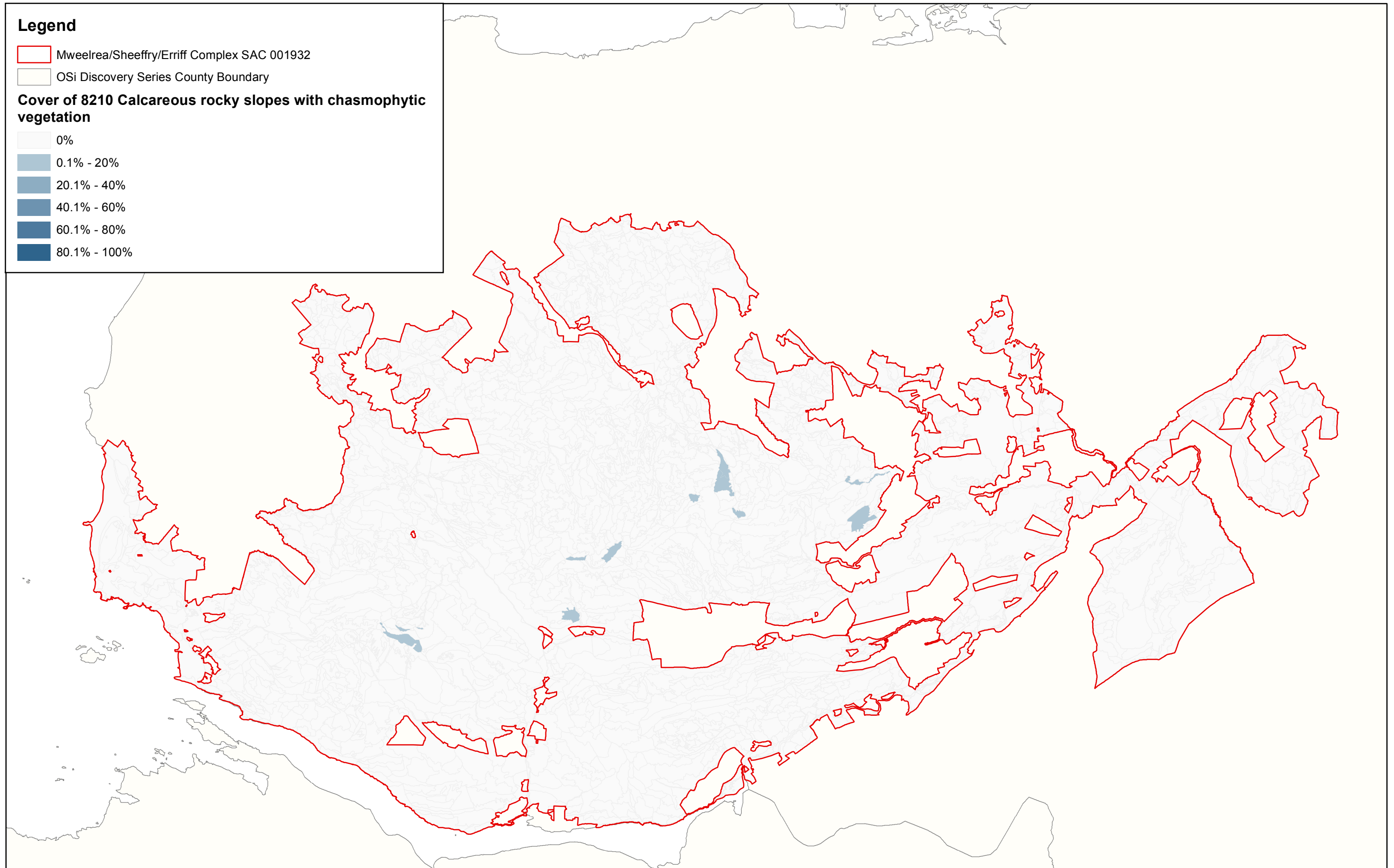
**Legend**

 Mweelrea/Sheeffry/Erriff Complex SAC 001932

 OSi Discovery Series County Boundary

**Cover of 8210 Calcareous rocky slopes with chasmophytic vegetation**

-  0%
-  0.1% - 20%
-  20.1% - 40%
-  40.1% - 60%
-  60.1% - 80%
-  80.1% - 100%

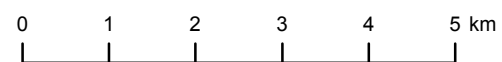


An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 17:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
CALCAREOUS ROCKY SLOPES**

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**





The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas









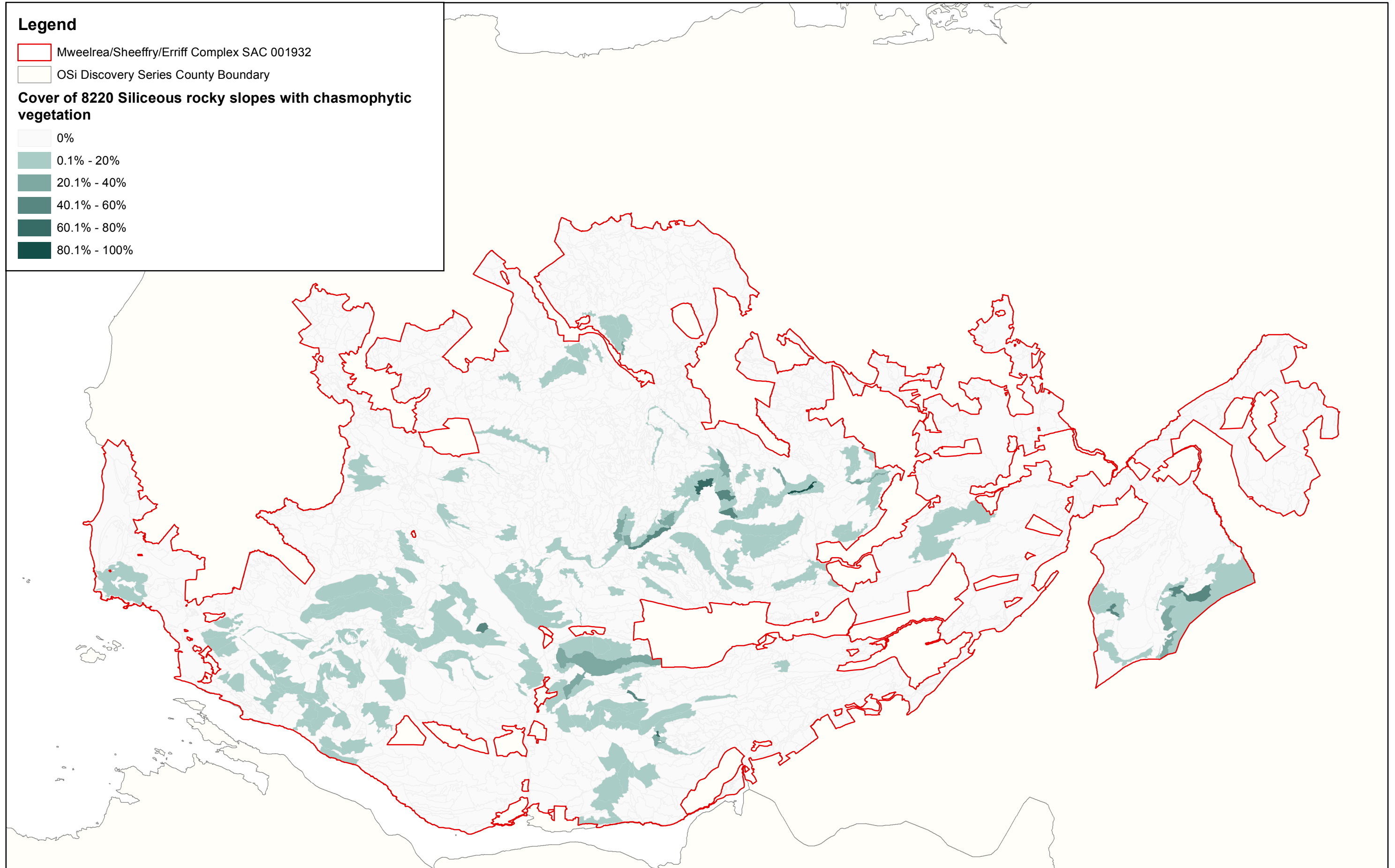
**Map Version 1  
Date: Aug 2017**

**Legend**

-  Mweelrea/Sheeffry/Erriff Complex SAC 001932
-  OSi Discovery Series County Boundary

**Cover of 8220 Siliceous rocky slopes with chasmophytic vegetation**

-  0%
-  0.1% - 20%
-  20.1% - 40%
-  40.1% - 60%
-  60.1% - 80%
-  80.1% - 100%



An Roinn  
Cultúir, Oidhreacht agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 18:  
MWEELREA/SHEEFFRY/ERRIFF SAC  
CONSERVATION OBJECTIVES  
SILICEOUS ROCKY SLOPES**

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

**SITE CODE:  
SAC 001932; version 3.01  
CO. MAYO**



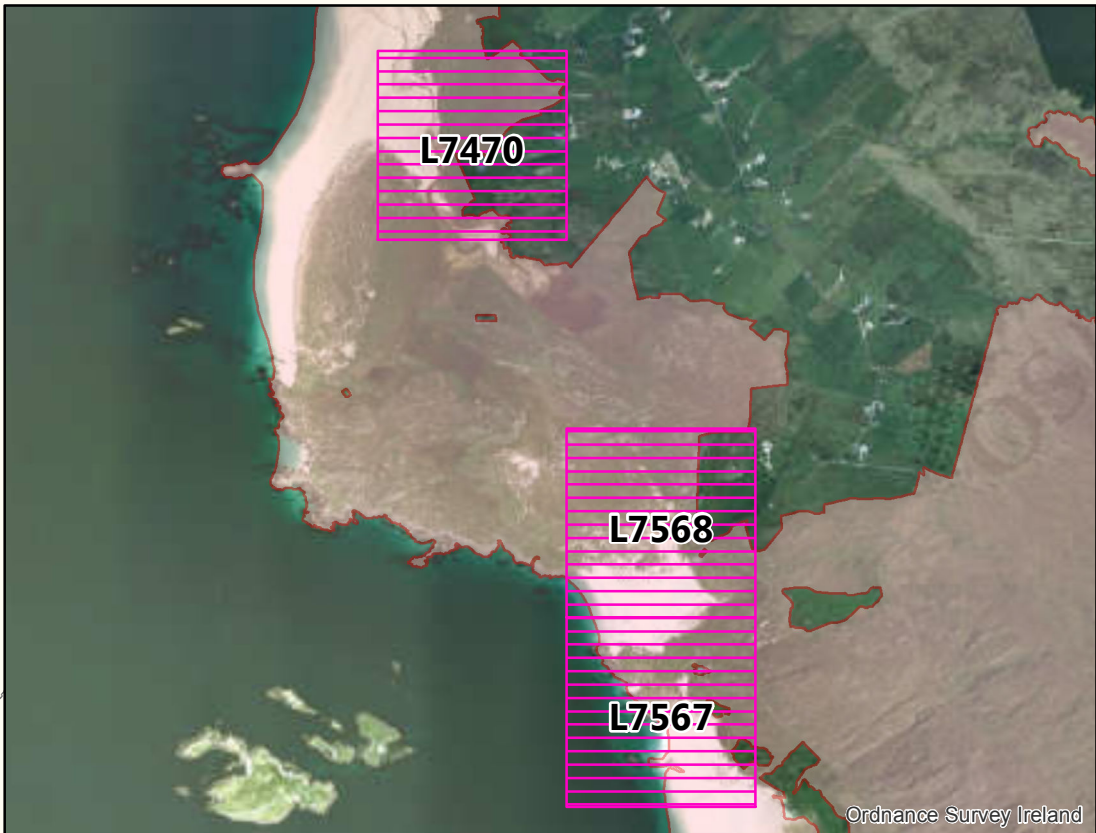
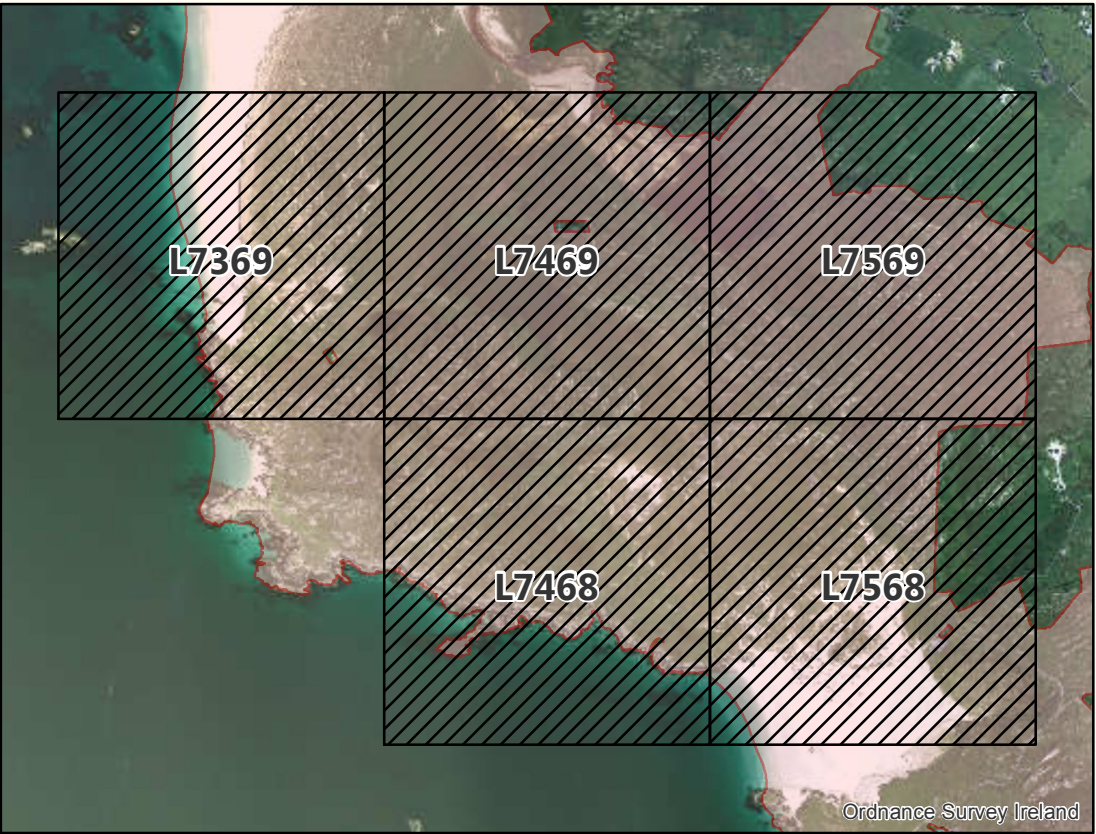
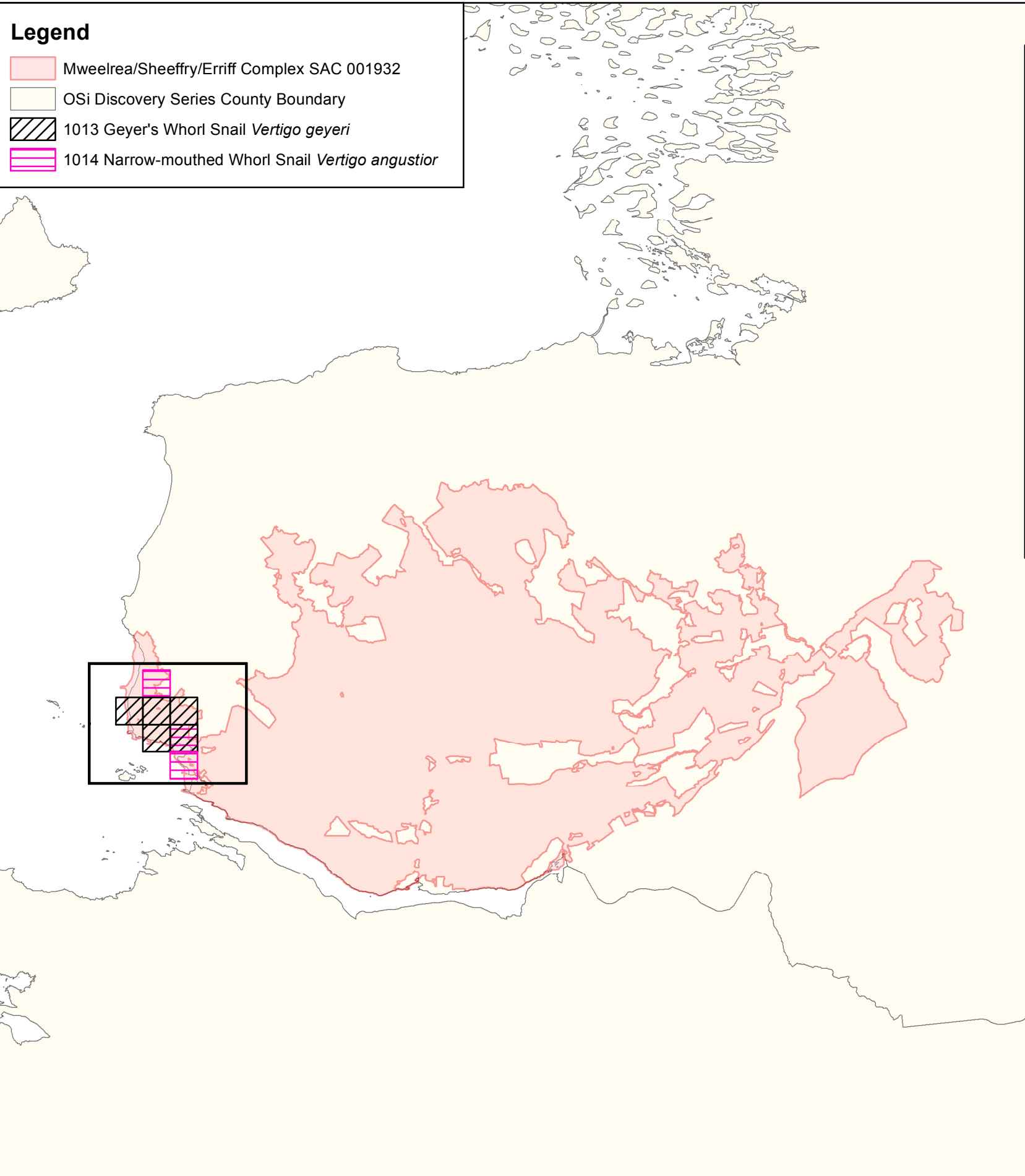
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland  
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

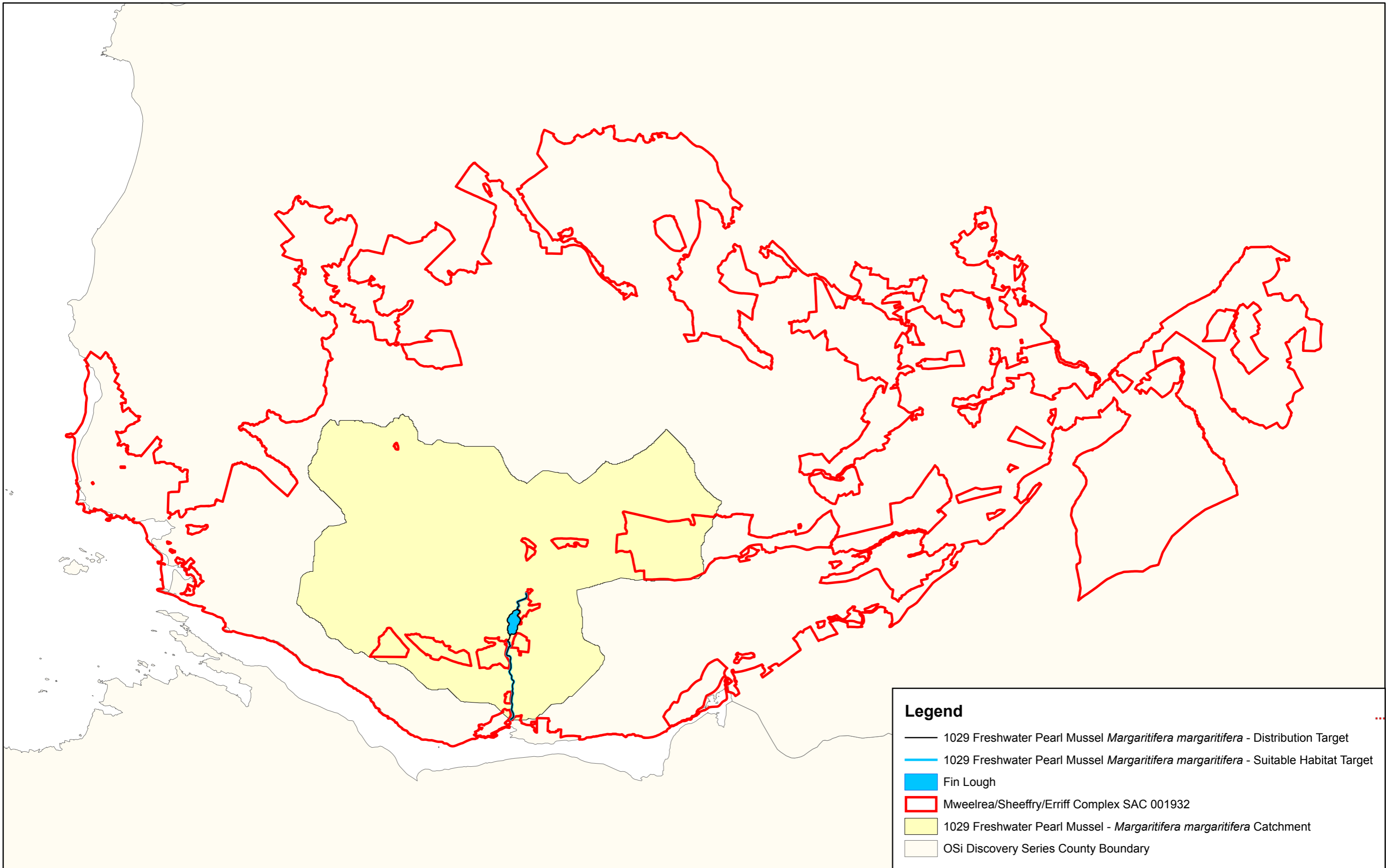


**Map Version 1  
Date: Aug 2017**

**Legend**

- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary
- 1013 Geyer's Whorl Snail *Vertigo geyeri*
- 1014 Narrow-mouthed Whorl Snail *Vertigo angustior*







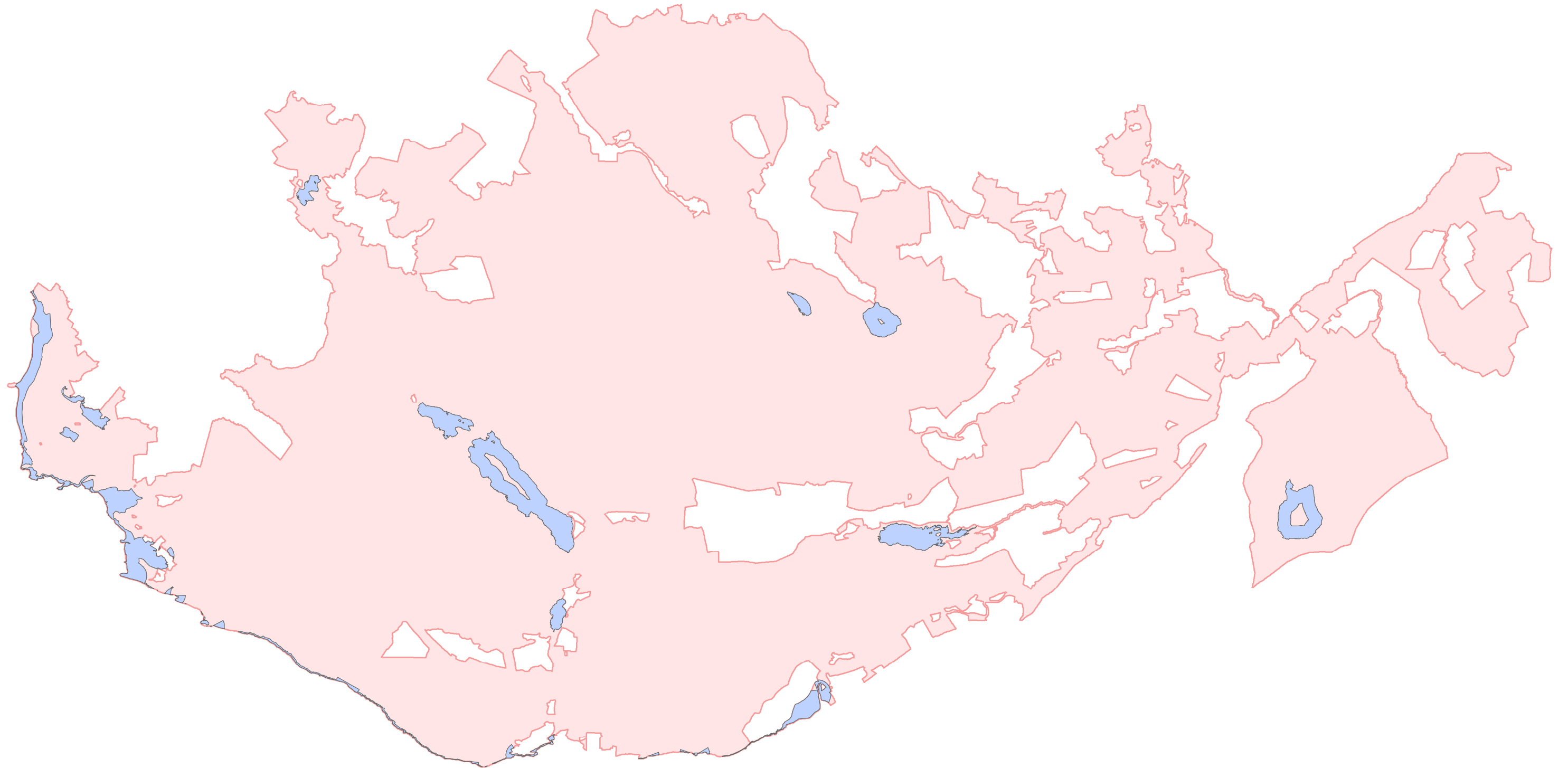
**Legend**

- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* - Distribution Target
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* - Suitable Habitat Target
- Fin Lough
- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- 1029 Freshwater Pearl Mussel - *Margaritifera margaritifera* Catchment
- OSi Discovery Series County Boundary



**Legend**

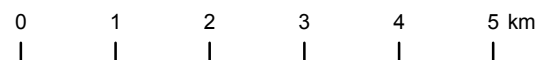
-  Mweelrea/Sheeffry/Erriff Complex SAC 001932
-  1355 Otter - *Lutra lutra* Commuting 250m Buffer



An Roinn  
Cultúir, Oidhreachta agus Gaeltachta  
Department of  
Culture, Heritage and the Gaeltacht

**MAP 21:**  
**MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC**  
**CONSERVATION OBJECTIVES**  
**OTTER COMMUTING HABITAT**  
Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:**  
**SAC 001932; version 3.01. Co. Mayo**






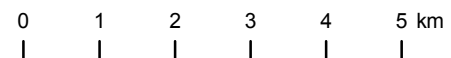
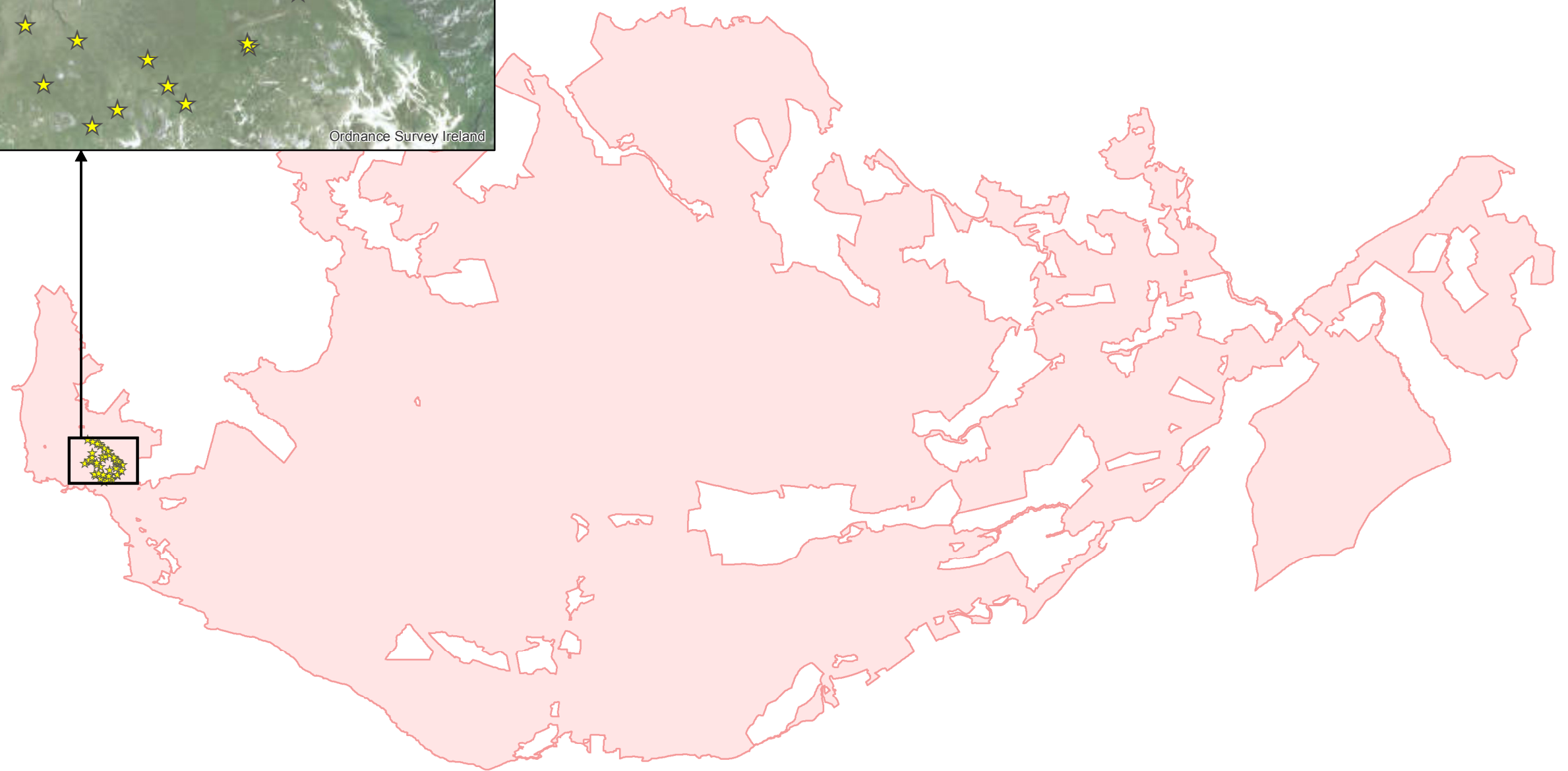
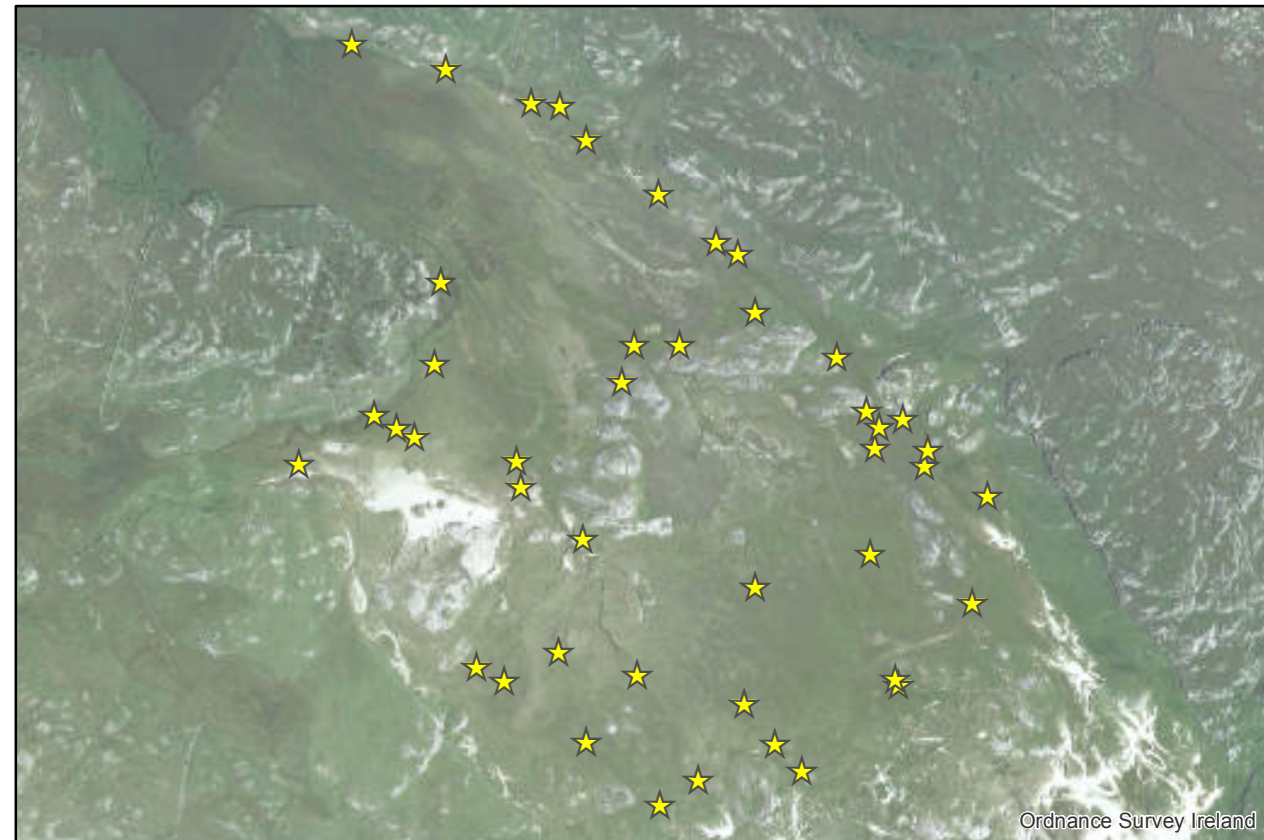
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059214. © Ordnance Survey of Ireland Government of Ireland.  
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

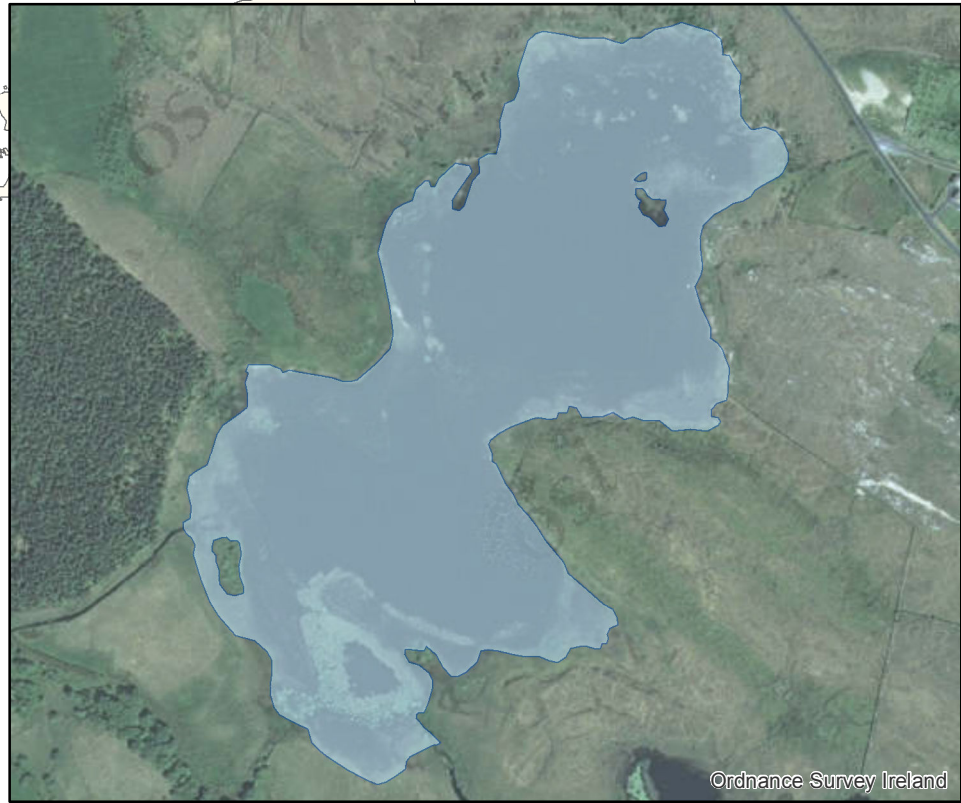


**Map Version 1**  
**Date: Aug 2017**

**Legend**

-  Mweelrea/Sheeffry/Erriff Complex SAC 001932
-  1395 Petalwort *Petalophyllum ralfsii*
-  OSi Discovery Series County Boundary





© Ordnance Survey Ireland

**Legend**

- 1833 Slender Naiad - *Najas flexilis*
- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- OSi Discovery Series County Boundary

